COAL AGE

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The Coal-Mining Outlook

BY FLOYD W. PARSONS

CONSUMERS of domestic and steam coals entered the winter with bins and yards completely filled. As a consequence many coal companies today are practically without orders. The chief question is: How soon will the industry awaken from its present torpor?

The situation today is quite similar to that which existed in the coal trade directly after war was declared. Then we passed through a period of inactivity and doubt. Now we are again marking time while the Nation is gripped by an epidemic of national indecision.

When business finally struck its gait late in 1917, the demands for fuel came so suddenly that producers were unable to satisfy the needs. Serious shortages occurred. Are we moving forward to a time when history will repeat?

Bins and stockpiles are now being depleted of fuel. The coal that has been stored will be exhausted everywhere at about the same time. Perhaps also the railroads will have reached the purchasing point at this identical moment. Should this occur fuel supplies will be insufficient and prices will soar. Another fuel famine will be ushered in and Federal control will likely have to be reinstated.

It is not wise for coal-mining men to look with complacency on present conditions. There is much to lose and nothing to gain by being damned by the public. To say "I told you so" is not sufficient. Consumers of coal have a short memory. Every possible effort must be made right now to point out the dangers that will arise from permitting coal stocks to be depleted.

The mild winter has caused a saving in coal consumption of about 5,000,000 tons. The slowing down in industries and the lessened demands on transportation are responsible for a further decrease in coal consumption of approximately 6,000,000 tons per month. The production of coal during January, compared with October, the last month of the war, showed a falling off of about 16,000,000 tons. The February decrease will be still greater. It is evident, therefore, that the falling off in output is considerably greater than the decrease in consumption. If this continues, a serious situation will arise.

Every effort should be made to get consumers to buy coal in moderation right now. If this is not done, prices are certain to go higher. The public has been misinformed. It has been told that if purchases were delayed, fuel prices would come down. Instead there has been an increase in the selling price of the higher-grade coals.

The hold-off policy of the railroads is further aggravating the situation. It is the next thing to criminal for politicians and transportation officials to set such an example at this critical time.

The sooner it is understood that coal cannot be produced unless there is a market for it, the better it will be for all concerned. Many consumers in various lines are beginning to realize what is coming and are crying aloud against the operators who have shut down their mines. These consumers forget that they do not go on manufacturing when their market disappears. And as for the newspaper editors who are demanding that coal be produced, let them consider: Do they print more papers than they can sell, and do they reduce the price of those left over?

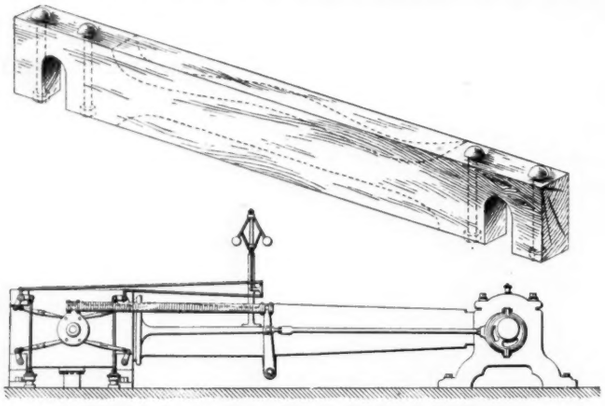
Notwithstanding the present lull in business and the mild weather, more coal is being consumed than is being mined. This does not portend lower prices and a happy situation in the months to come.

IDEAS AND SUGGESTIONS

Ingenious Engine Repair Kept Mine Plant from Shutting Down

The coal-mine mechanic must be highly resourceful. He must keep the mine machinery going whether he has anything to keep it going with or not. If an engine or pump breaks down and no spare or repair parts are to be had, he must repair it anyway and keep it running. Otherwise the mine may be compelled to shut down, either in whole or in part.

The accompanying illustration shows an emergency



EMERGENCY REPAIR TO CORLISS ENGINE

repair to a Corliss engine. The rod transmitting motion between the rocker arm and the wrist plate broke in such a way that it could not be readily repaired at the mine plant. The master mechanic was hurriedly called. In the course of a comparatively short time he had ascertained the exact distance between the rocker arm and wrist-plate pin centers, and the diameters of these pins. This distance center to center he laid out accurately on an oak plank of suitable dimensions.

About this time a carpenter that he had sent for arrived with a brace, an expansion bit, a square and a saw. First, holes of the diameter of the two pins were bored at the center points previously determined. The portion of the plank lying between these holes and one edge was then cut out, making a round-bottomed notch. The plank was then slipped over the pins on the valve gear and the engine started.

A new rod was of course immediately ordered. At the first opportunity the carpenter trimmed up the plank-valve rod substitute to the outline indicated by the dotted lines in the illustration. This rendered the plank much lighter, while leaving ample strength to work the wrist plate. Two small carriage bolts were also added at either end to prevent splitting.

This wooden rod, while it looked sufficiently ungainly to jar upon the nerves of any artistically inclined power plant man, kept the engine running and prevented a shutdown until the new rod arrived. It was then stored away carefully against a future emergency.

New Safety Detonator Does Away with Fulminate of Mercury

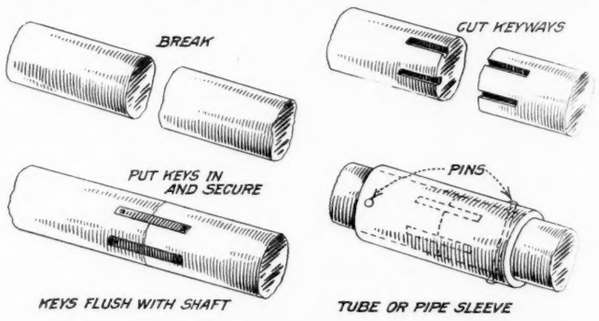
Although Germany has been in the throes of war for over four years, her chemists have been remarkably active and one of their new products is a safety detonator. This contains a cheap and effective substitute for fulminate of mercury. The latter, besides being costly, is dangerous to handle, and in the caps is unstable, a little dampness causing it to attack the copper or brass, forming a copper salt far more explosive than the fulminate itself.

The new filling is a mixture of potassium chlorate and antimony sulphide—neither an explosive substance. Held against this by a thin strip of tin is a varnish of gum lacquer, containing ground red phosphorus and a little diphenylamine; and as the primer is detonated (through concussion) ignition is produced by friction of the phosphorus against the charge.

Temporary Repairs to Broken Blower Shaft Prevented Shutdown

BY CHARLES H. WILLEY
Concord, N. H.

Because of a flaw a 2-in. blower shaft broke, as shown below. The blower was urgently needed in order to carry the peak load, and it was therefore necessary to effect temporary repairs that would at least allow the machine to run at half speed until a new shaft could be obtained or the broken one fitted with a flange coupling



REPAIR DETAILS OF BROKEN BLOWER SHAFT

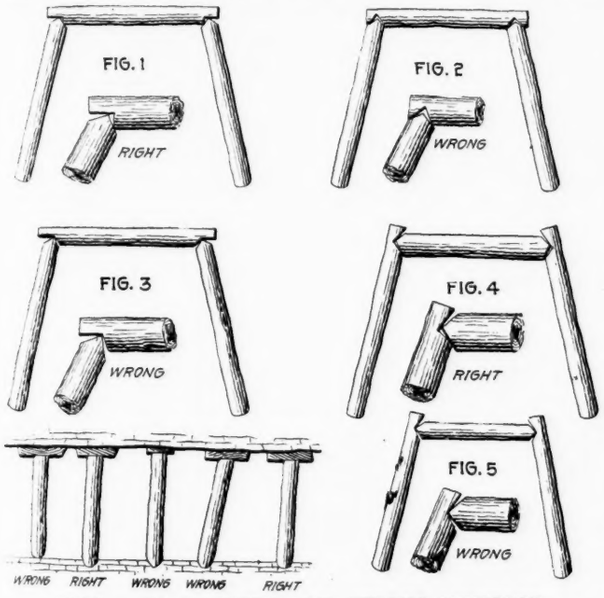
at the break. The way the difficulty was overcome is shown in the accompanying illustrations.

One drawing shows the shaft ends. Two keyways, $\frac{3}{8}$ in. deep and equally wide, were cut in each. Next the shafts were butted together and keys fitted and secured in place. Then a pipe sleeve was heated, slipped over the shaft and shrunk on over the break and the keys. This was also pinned in each piece of the shaft and the pins riveted over. The blower was run at three-fourths speed. Everything went nicely, and the job lasted until a new shaft arrived, which was about three weeks later.

Timbering in Mines Made Safe by Means of Drawings

By Joseph R. Thomas
Plymouth, Penn.

While there is no classification of employment in the mines where practical experience is more essential than in timbering, it has long been known that a large number of accidents have occurred owing to the improper methods with which mine timbers have been erected. A good scheme to adopt would be to have drawings made and posted on or near the mine entrance. These should show the right and wrong methods of setting timbers. There is no doubt that if this type of drawings was posted at the mines it would awaken the interest of the men, especially the younger ones. When it is borne in mind that the young man generally copies the methods adopted by the man with whom he works or has worked, and that having no other guide than to do his work the way the man he worked with did it, whether it was right or wrong, it is not surprising that the work continues to be done in an unsystematic, dangerous manner. If a sketch similar to the one here presented were posted at the mines I honestly believe it would prove beneficial to the whole mining industry.



FIGS. 1 TO 5. RIGHT AND WRONG METHODS OF TIMBERING

Hints to the Pulverized Coal User

A. V. Adamson, discussing a paper read by H. R. Collins before the American Institute of Mining Engineers, makes the following interesting remarks:

1. Pulverized coal is not suitable for all purposes, and the character of the fuel available is one of the factors causing the necessity for separately considering each proposed installation.

2. Honeycomb and ash on tubes, and slag on walls and furnace floor, can be controlled.

3. Flame velocity must be reduced to a minimum.

4. No continuous operating efficiency or continuous good results can be obtained with pressure air for combustion, even if only ⅜ oz. pressure is used; and the more nearly a furnace approximates a balanced-draft condition, the better the operating results.

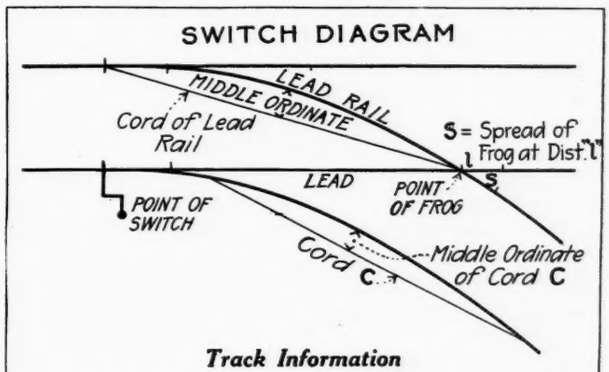
5. The incoming fuel must be mechanically mixed with the air-conveying medium to prevent a pulsating flame and the formation of coke due to lumps of pulverized coal in the feed.

6. Speaking generally, the use of coal in pulverized form, for steam generation, metallurgical and chemical work, affords fuel economy and increased production per unit. It is the one way by which the shortages of oil, gas, coal, transportation and labor can at one and the same time be met. Due consideration, however, must be given to the difficulties inherent in, and the troubles incident to, improper design and installation. In other words, an installation for the economic utilization of fuel in pulverized form is not one which can be purchased over the counter, and special experience or development is essential for each individual installation.

Common Track Difficulties and Their Solution

By Harry Goodnow
DuQuoin, Illinois

Many good articles and treatises on mine tracks and and their construction have been written and published, but unfortunately all foremen and track builders do not possess or have access to them. The data shown in the accompanying illustration may be printed on tracing cloth, blueprinted and furnished to every man in any way responsible for the construction or maintenance of tracks in the mine.



Track Information

The "Frog No." is the spread at any point into the distance of that point, from the frog point.

The "Lead" (dist. from frog to switch points); is twice the gauge times the Frog No.

The "Middle Ordinate" is the distance a rail is bent out of line in curving it.

The "Middle Ordinate of the Lead rail" is ¼ the gauge.

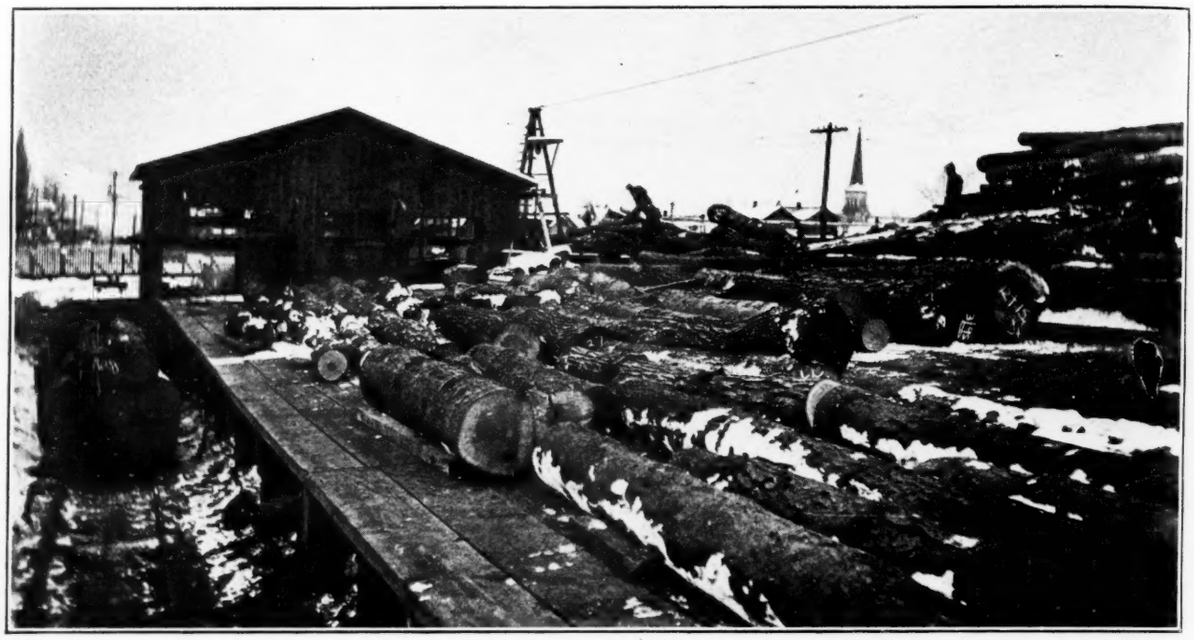
The "Latch Length" is twice the Frog No. times the square root of twice the gauge in inches.

The "Mid. Ord." of a 20 ft. chord is 4 times that of a 10 ft.

The "Mid. Ord." of a 30 ft. chord is 9 times that of a 10 ft.

CARD GIVES VALUABLE TRACKLAYING DATA

Although the little "dope" card made up as described above can by no means be compared to some of the elaborate treatises on the subject of tracklaying, it nevertheless answers most of the questions that arise in the course of the day's work. It might well form therefore a part of each trackman's equipment.



Economical Timber-Handling Plant at an Anthracite Mine

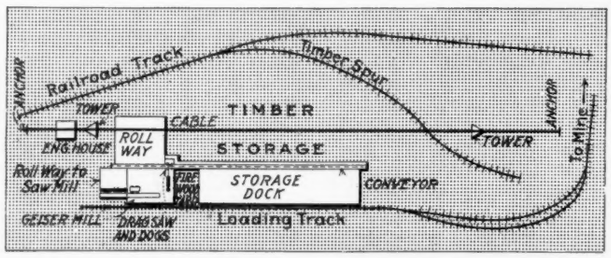
By RALPH A. SMITH
Superintendent, Kingston Coal Co., Plymouth, Penn.

THE problem of supplying the Pennsylvania anthracite mines with the amount of timber necessary to safeguard both the men and the property has become more difficult year by year; the local supply of timber being about exhausted, it must now be obtained from a distance and is shipped into the collieries on railroad cars. Mining conditions in this region require the use of a much larger amount of timber per ton of coal mined than the average bituminous mine of the country, a mine of moderate tonnage often consuming over 250,000 lineal feet of such timber in one year. Timber is often delivered in car lengths and of a diameter at times as large as 36 in., making it an expensive task to unload and prepare it for use by hand.

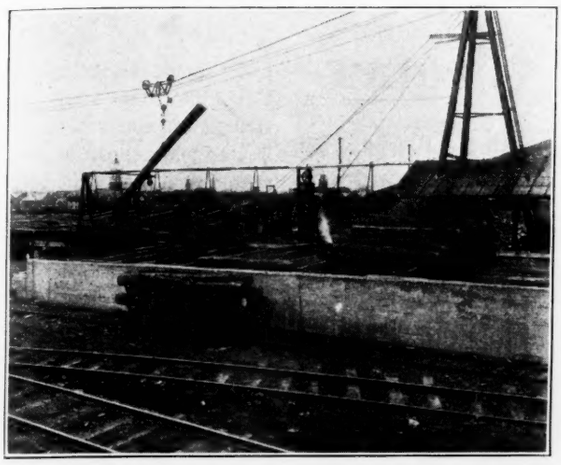
The Kingston Coal Co., at its mines in Edwardsville and Plymouth, Penn., has installed a modern system by which this is done with a minimum amount of hand labor. The accompanying plan shows the general layout of the scheme. A cable haulage transfer system delivers the logs from the railroad car to either the rollway or to the stock pile. A 9 x 12-in. Lambert double-drum transfer hoist, 1½-in. steel wire cable, and $\frac{9}{16}$-in. steel wire transfer and hoist ropes, make up this part of the outfit.

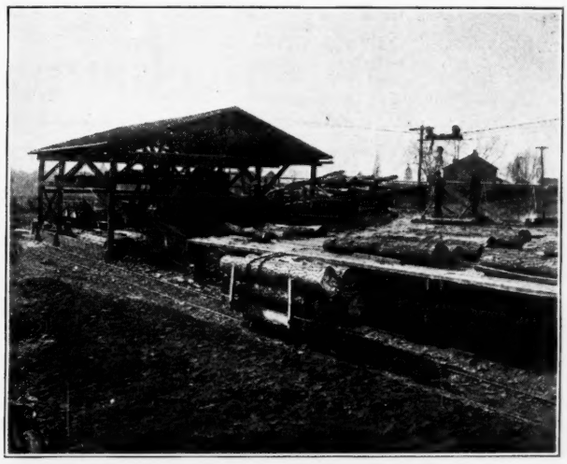
The towers are of wood, about 30 ft. high, with a span between them of 300 ft., giving ample storage room for stock timber. Logs placed on the rollway are delivered into an electric-driven conveyor of 6-in. pitch Keystone chain, with 3 x 5-in. hardwood carrying blocks. The conveyor is driven by a General Electric 30-hp., 250-volt, direct-current motor, with a Type A controller, manufactured by the Electric Controller and Supply Co., Cleveland, Ohio, and can be operated in either direction. The sides of this conveyor are marked in feet in both directions from the saw, so that props can be cut to length without the necessity of resorting to a tape or rule.

A No. 0 steam drag saw and a pair of steam dogs, manufactured by the Hill-Curtis Co., Kalamazoo, Mich., are so located that the props are cut without removal from the conveyor. It requires an average of 30 seconds to cut through a 24-in. hardwood log. From the saw, the cut timber still travels in the conveyor along the distributing dock, where it is stored by sizes and from which it is loaded for transportation into the mines. All these operations are accomplished with a minimum amount of hand labor. Waste ends, and also the broken timber removed from the mines, are made into firewood by a special cutoff saw and wood splitter, the wood being sold to employees at the actual cost of handling. A Geiser saw mill is connected with the plant and selected logs are turned into such sizes of lumber as are needed to serve different purposes at the colliery and shops.



PLAN OF TIMBER-HANDLING PLANT, GAYLORD COLLIERY





UPPER LEFT

Timber dock, cable transfer and drag saw

UPPER RIGHT

Sawmill and loading dock

UPPER CENTER

Timber being unloaded from cars

LOWER CENTER

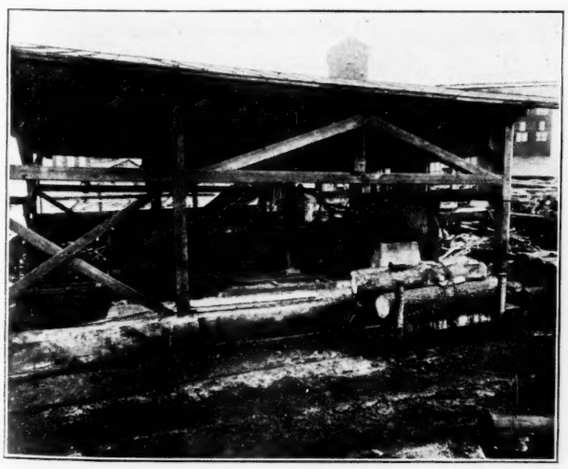
Drag saw in operation

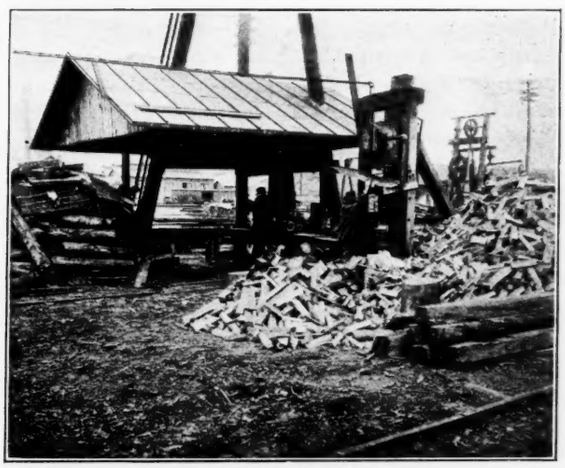
LOWER LEFT

Sawmill at the Gaylord Colliery

LOWER RIGHT

Cutting sawn logs into kindling wood





Views of the Timber-Handling Plant of the Kingston Coal Co.

Timber shipped in to the plant from a distance is unloaded by a haulage transfer system, and cut into lengths suitable for use as props. Waste ends and broken timber are made into firewood by a special cutoff saw and wood splitter

Bradford Coal Breaker and Preliminary Mechanical Cleaner

SYNOPSIS—*In coal preparation where a large percentage of screenings or slack is desired, the Bradford breaker or screen finds a legitimate field of activity. This device for breaking coal into small pieces and cleaning it of impurities is used principally in connection with coke plants and to a less extent in preparing bituminous coal for producer, stoker or special use. Its construction, operation and advantages are here noted; some interesting tests of what has been accomplished by this device at commercial plants are given.*

AT THE present time it is a common practice in some coal-mining sections to use a Bradford coal breaker as the first unit for the preparation of bituminous coal to be coked, or the sizing of run-of-mine coal for producer or stoker use. The principal function of the apparatus is to break and screen mined coal to a size suitable for further reduction by crushing, or for producer or stoker use, simultaneously discharging in a separate chute a portion of the material tougher than the pure coal. The breaker was patented in 1873 by Hezekiah Bradford, of Reading, Penn. He had in view the breaking, sizing and preliminary cleaning of anthracite coal, without causing the excessive quantity of fines produced by the toothed rolls then in general use. However, it did not accomplish, on a commercial scale, what was proposed on account of the nature of anthracite coal and intermixed impurities. Its first employment in the preparation of coking coal is recorded in 1891, when the St. Bernard Coal and Coke Co. (Earlington, Ky.), the St. Clair Coal and Coke Co. (Bradenville, Penn.) and the Loyalhanna Coal and Coke Co. (Loyalhanna, Penn.) used it for the breaking, sizing and preliminary cleaning of coal.

At this time there are approximately 300 Bradford breakers in active operation in the United States; about 75 per cent. of these are in connection with byproduct and beehive coke-oven plants, the others for preparing bituminous coal for producer, stoker and special use.

The present construction and operation of the breaker differ materially from the first installation and early practice, the improvements being important and of value; while the original machine demonstrated the merit of the principles involved, yet its mechanical operation or action was not satisfactory. The principle is to break the pure coal by concussion and screen it out through the encircling perforated plates, while the impurities, mingling with the mined coal, are generally too tough to be broken by this force of concussion and therefore pass over the perforations and out at the end of the machine to a separate chute. The breaker consists of a large diameter cylinder covered with perforated steel plates; it is intended to revolve slowly.

The machine is useful for preparing coal for further crushing and cleaning (Fig. 2); however, if the coal, after passing through the perforations of the breaker, is considered clean enough for coking, then a pulverizing mill is substituted for the rolls, so that impurities intermixed with the coal will be powdered and the whole product be of the same degree of fineness. The function of the Bradford screen is to break the pure coal to a size that will sift through the perforations, without breaking much of the bony coal, slate, rock and pyrites intermixed with the coal; further, that these impurities may be discharged separately. It also automatically discards foreign matter larger than the perforations, like car and rail irons, wooden sprags, and so on, that would be injurious later to the rolls or pulverizers. Bins are provided which act as reservoirs to insure a uniform supply of coal to the preparation plant and as storage in case of irregular delivery of coal from the mines.

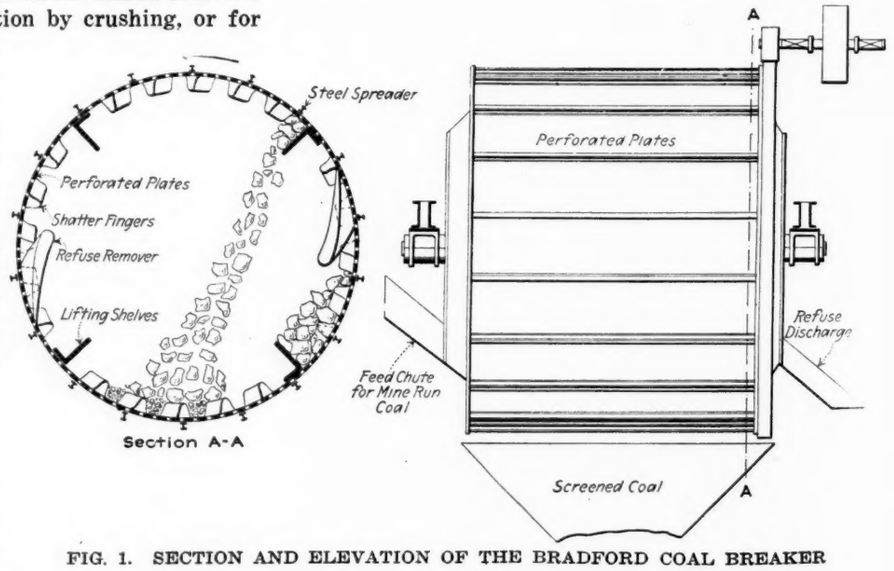
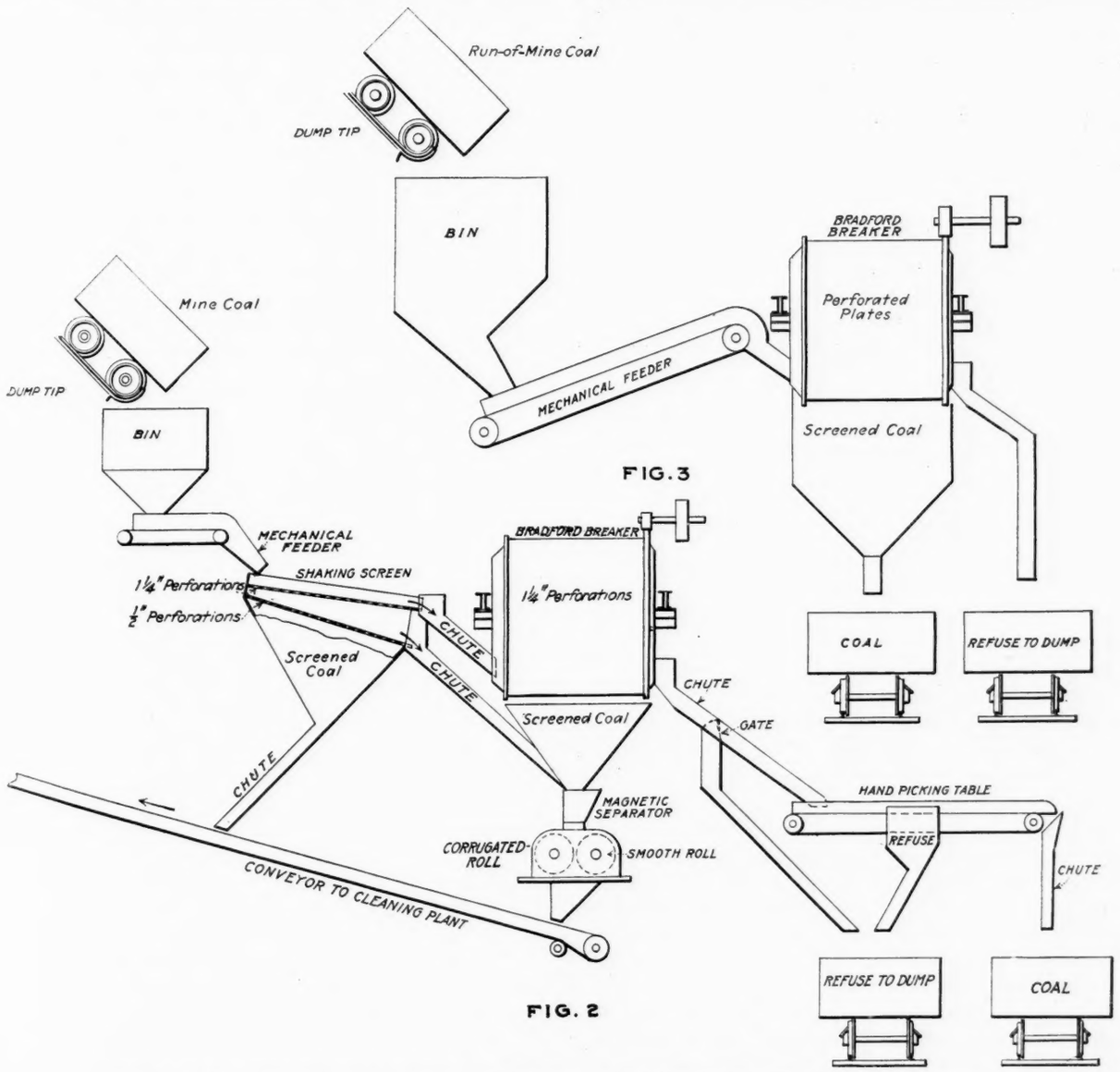


FIG. 1. SECTION AND ELEVATION OF THE BRADFORD COAL BREAKER

The mechanical feeder not only regulates the tonnage delivered to the screens but also tends to balance the loading of elevators and conveyors handling the prepared coal. The shaking screen separates the coal into sizes suitable for further treatment; it relieves the breaker of handling coal already of the proper size for the rolls, and it also bypasses around the rolls the coal that is fine enough for use. The duty of the magnetic separator is to remove pieces of iron, like bolts, nuts, rivets and mining machine parts, that drop through the

perforations, thus preventing serious injury to the rolls or the pulverizer.

The advantages of rolls are that they break the coal so as to release more or less of the impurities of a laminated nature, without pulverization; crushing, grinding, pounding, bruising and pulverizing all tend to create powder or dust of both the coal and the impurities; this latter is quite an unfavorable condition and plants when the coal seam is quite free from impurities. Table I is a record of Bradford coal-breaker tests made at coal plants. Complete details are noted. All these tests, with the exception of Nos. 6 and 11, are taken from monthly averages, and at coal plants operating in connection with byproduct coke ovens. No material reduction in ash or sulphur content is shown with the exception of tests Nos. 5 and 11. No. 5 indicates



FIGS. 2 AND 3. TWO TYPICAL INSTALLATIONS OF BRADFORD BREAKER AND ACCESSORIES

hinders success in either a dry or wet method of coal preparation.

The hand picking table is of use when the coal seam contains bands of bony or high ash coal; the breaker is then adjusted and operated to discard as much as possible of this inferior coal, together with the other bulky impurities, as these coals inferior for coking purposes contain much fuel value for steam and domestic use; the fuel values are separated from real impurities by hand, while being conveyed on the picking table.

Fig. 3 illustrates the average installation of a breaker for preparing stoker coal or for other special use; this arrangement is also used at some beehive oven coke

an ash reduction from 13.10 per cent. to 11.15 per cent., and sulphur reduction from 3.35 per cent. to 2.90 per cent., by screening out 3 per cent. of the impurities. No 11 test indicates an ash reduction from 16.88 per cent. to 13 per cent., and sulphur reduction only from 0.86 per cent. to 0.84 per cent., by taking out 14 per cent. of the impurities. Both the run-of-mine and screened coal from this test (No 11) were not satisfactory, regarding the ash content, for coking. The screened coal, after the 14 per cent. of impurities was removed by the breaker, was washed, with the results shown in the record of No. 11 test. While the ash content was further reduced to 9.13 per cent. in the washed

coal, there was discarded as refuse a total of 26.52 per cent. of the run-of-mine coal—14 per cent. with ash, averaging 41.21 per cent. by the breaker and 12.52 per cent. with ash or 35.71 per cent. by the washer; of course, the great loss of the original run-of-mine coal to reduce the ash content in the coal to a point practical for coking use would not permit the installation of a commercial cleaning plant.

In the general operation of the Bradford breaker run-of-mine coal is automatically fed into one end of the cylinder (while revolving), is picked up by longitudinal shelves and dropped, falling on cast steel "shatter fingers" attached to the perforated plates; the coal is shattered by concussion (See Fig. 1), and the pieces that are small enough sift through the perforations; the shelves following pick up the large pieces, which are again thrown down. The coal in falling from the shelf has not only the force derived from its own gravity, but receives considerable additional force from the momentum of the cylinder. The coal does not fall upon coal in the lower part of the cylinder, but upon the shatter fingers and perforated plates, because the coal is constantly carried toward and upon the rising side and

in the making of which certain ingredients are used under fixed conditions with results always approximately the same; on the other hand, it is a natural product varying greatly in quality, often even in the same seam, and it must be admitted that any attempt to standardize a coal-preparing machine or method under these circumstances would prove an almost impossible task. Coal always contains a certain amount of inorganic matter or ash, which is intrinsically part of the coal. The question as to whether one could clean a given coal materially or not depends largely—essentially, in fact—on the way in which that inorganic matter was distributed through the coal.

The rated capacity of a breaker is the number of tons that can be broken enough to sift through certain size perforations in a given time (usually one hour), and simultaneously to discharge separately from the broken coal the impurities not broken by the action of the breaker. Breakers, now in operation, vary in capacity from 30 tons an hour—fitted with ½-in. perforations and handling tough coal—to 400 tons an hour—fitted with 3-in. perforations and handling friable coal.

The quality of work done by a breaker is shown by

TABLE I. BRADFORD COAL BREAKER TESTS MADE AT COAL PLANTS

Details of Bradford Breaker									Run-of-Mine Coal		Screened Coal				
						Power Required					Dry Basis		Dry Basis		
No. of Test	Diameter, Ft.	Length, Ft.	Size of Perforations, Sq. In.	Periphery Speed, Ft. per Min.	Feed per Hour in Net Tons	No Load	With Load	Starting Loaded	Seam and Location	Nature	Per Cent. Ash	Per Cent. Sulphur	Per Cent. Ash	Per Cent. Sulphur	Per Cent. of Water	Per Cent. of Tailings
1	12	11	1¼	415	100	6.2	8.8	32	Pocahontas, No. 3 seam, West Virginia	Soft	4.75	0.78	4.70	0.80	2.25	0 75
2	12	11	1¼	415	100	6.2	12.6	35	Boomer, Eagle Seam, West Virginia	Hard	6.70	1.25	6.35	1.22	4.30	2 50
3	12	11	1¼	580	200	6.7	24.2	46	Pocahontas, No. 4 Seam, West Virginia	Soft	5.02	0.61	4.98	0.62	2.10	0 63
4	12	11	1¼	580	200	6.7	32.3	52	Pittsburgh Gas Coal, Pennsylvania	Hard	8.36	1.55	8.10	1.48	3.20	1 14
5	12	11	1	520	210	6.4	41.0	57	Miller B Seam, Pennsylvania	Soft	13.10	3.35	11.15	2.90	2.90	3 00
6	12	11	1¼	580	120	6.5	39.0	58	Elkhorn Seam, Kentucky	Hard	4.25	1.05	4.22	1.05	2.50	10 40
7	9	11	1¼	425	160	6.1	19.5	38	Kittanning B-Seam, Pennsylvania	Soft	10.80	2.45	9.50	2.00	3.05	6 00
8	9	11	1	425	120	5.2	18.0	33	Phalen Seam, Canada	Soft	9.60	3.05	8.55	2.54	3.10	4 10
9	9	11		425	140	5.6	20.3	37	Miller B Seam, Pennsylvania	Soft	9.25	3.90	8.40	3.36	3.60	5 50
10	9	11		425	125	5.9	18.6	36	Miller B Seam, Pennsylvania	Soft	8.80	2.95	8.25	2.75	2.25	2 15
11	9	11		425	60	5.8	8.2	27	Trinidad Seam, Colorado	Soft	16.88	0.86	13.00	0.84	1.00	14 00

shelf. In rolling and tumbling around in the cylinder any remaining pieces of pure coal attached to the impurities break away and sift through the perforations. The cast-steel shatter fingers not only aid in shattering the coal, but are so set on the inside of the cylinder as to form a spiral, which can be adjusted either to rapidly advance the body of coal to the opposite end or to retard its progress. Fastened in the opposite head of the cylinder from which the coal enters are refuse removers (wing-like in form) which automatically discard any impurities or other matter larger than the perforations into a chute. The coal sifting through the perforations on the revolving screen is collected underneath the cylinder and is conducted by a chute to the desired point for shipment or treatment.

The Bradford breaker is adjusted and detail parts are designed to suit the physical characteristics of the coal to be treated, the requirements of the market and the general conditions and circumstances of each individual case. The capacity and quality of work is affected by the diameter and length of the screen, the size of perforations, speed of rotation, spirality of the shatter fingers and the moisture content and physical properties of the pure coal and impurities. The difficulty with coal, of course, is that it is not a manufactured article,

the quantity of pure coal broken fine enough to sift through its perforations, without at the same time breaking the impurities (that are more or less intermixed with the coal) so small as to permit of their passing through the perforations; thus these impurities may be discharged separately from the coal. When making comparisons of different installations regarding the capacity and quality of work done by breakers, it must be kept in mind that many coals which break cubical in shape (or nearly so) go through a screen quite fast, but coals which break in elongated pieces do not screen nearly as fast as the cubical coal. Also, when comparing laboratory tests with commercial results, it should be remembered that the laboratory tests show the best theoretical results attainable by working in the ways described—the laboratory results represent the ideal to be attained by commercial methods.

Structurally a Bradford breaker is a circular screen of perforated plates which are bolted to an iron framework; cast-iron spiders, or rings, carry this framework, and these rings are rigidly connected to a central longitudinal revolving shaft. The screen is inclosed by a casing which confines dust and prevents its circulation throughout the tipple; the casing protects workmen against accident and yet suitable doors are provided so

that necessary inspection of the screen and its operation can be made. All portions of the screen are constructed so as to permit of ready renewal or adjustment of parts; should the character of the coal being prepared change, or different marked conditions develop, then parts either can be replaced or adjusted without serious disturbance to the plant. The perforated screen plates are made of extra heavy steel cut to a standard size so as to fit any breaker of the same diameter. These plates can have one size perforations at one end of the screen and larger perforations at the other end; this arrangement permits of two sizes of coal being made. Suitable provision in the chute to carry off the screened coal keeps the two sizes separate.

The cast-iron lifting shelves in the screen are made of a width, length and angle proportioned to the work desired and the speed of rotation, so that the coal may slide from the shelves at the proper height to fall upon the required part of the inner side of the screen; the shelves are made interchangeable and can be replaced or their position changed without affecting other parts of the breaker. Usually four shelves are equally spaced on the inner side of the screen, although from one to six shelves may be used, depending on the coal handled.

The cast-iron refuse removers in the screen automatically discharge the impurities; generally two are used for rapid discharge. However, if a portion of the coal is more or less tough, so that it requires further tumbling to break up the coal, then only one remover is used. In selecting a breaker it will be well to confer with those familiar with the principles involved, its construction and operation; also, one should be thoroughly versed as to the nature of the coal to be handled and the separation of impurities desired. Each variety of coal requires special treatment in the breaker, which can only be accomplished by properly proportioning the parts during construction. The method of operation should be determined after a careful study of the physical properties of the coal. A knowledge of the business end of the proposition is essential, as that often makes all the difference between success and failure. It is rather remarkable that in some districts collieries which are in close proximity to each other sometimes differ in a radical manner in their treatment of the same seam of coal. In designing a plant it is not always safe to rely on a neighbor's experience, or even on one's own experience elsewhere. This uncertainty is often most puzzling and perplexing, but perhaps it is the most interesting of the various problems in connection with mining engineering.

Details of No. 11 Test—Below is given a record of five tests made with run-of-mine coking coal from five mines working the same coal seam with a Bradford coal breaker 9 ft. in diameter and 11 ft. long. Perforations ½-in. square, peripheral speed 425 ft. per min. Feed 60 net tons per hour. The coal was quite soft and dry, the rock and bony tough and the slate brittle.

RECORD OF TESTS WITH RUN-OF-MINE COKING COAL

	Run-of-Mine Coal		Screened Coal		Breaker Refuse	
Mine	Per Cent.	Per Cent. Ash	Per Cent	Per Cent. Ash in Screened Coal	Per Cent.	Per Cent. Ash in Refuse
1	100	18.70	87.71	14.10	12.29	51.30
2	100	15.45	86.43	10.84	13.57	44.65
3	100	16.25	85.81	13.00	14.19	35.70
4	100	15.80	90.17	13.30	9.83	38.40
5	100	18.22	79.85	13.72	20.15	36.00
Average,	100	16.88	86.00	13.00	14.00	41.21

The foregoing tests show that discarding 14 per cent. of the impurities in the run-of-mine coal larger than the ½-in. perforations reduced the ash content from 16.88 per cent. to 13 per cent., which was not acceptable for furnace coke. The screened coal from the five tests was washed, with the results shown below:

Kind	Per Cent. Run-of-Mine Coal	Per Cent. of Kind	Per Cent. Ash
Breaker screened coal	86.00	100.00	13.00
Washed coal	73.48	85.44	9.13
Washer refuse	12.52	14.56	35.71

The foregoing results indicate that to reduce the ash content from 16.88 per cent. in the run-of-mine coal to 9.13 per cent. in the washed coal it was necessary to discard a total of 26.52 per cent. of the run-of-mine coal as breaker and washer refuse.

Deep-Seam Working Opens Up Question of Reducing Temperature

BY MARK MEREDITH
Liverpool, England

The time has arrived when it is believed means should be taken to deal with the detrimental effects of continuous working under conditions of high temperature in certain mines. At the Ashton Moss colliery (the deepest in Great Britain) and others, many improvements which have been made during the last 30 years would be as essential in working beds of coal at 4000 ft. as they have been within recent years in mines of one-third that depth.

Among these improvements might be mentioned a safety lamp capable of withstanding an explosive current traveling at a high velocity, the introduction of electric light, the modern fan and the mechanical under cutting of the bed (in longwall working) in straight lines. There will be a greater percentage of small coal in deeper mines, due to the crushing effect of the overlying weight, but modern experience has shown that small coal, which formerly commanded a low price, has now become a valuable asset through the development of byproduct plants. In recent years explosions have been less frequent than formerly, and it may be expected that freedom from serious accidents will continue.

In order to effect a reduction of the temperature in the deeper mines, and render them as suitable for human effort as those in beds of less depth, some modifications will be required in the systems hitherto adopted for conveying the intake air along certain roadways to the coal face and returning the vitiated air along other roads to the upcast shaft.

Information is now sought from the makers of modern refrigerating plants concerning their experience in cooling atmospheres, so that colliery officials may consider how similar systems may be utilized for reducing the temperature in deep workings.

The use of compressed air in place of steam is one means of keeping the temperature down, as is also the driving of roads for cold-storage chambers in suitable strata within a reasonable distance above the coal beds to be worked, in which large volumes of air from the downcast shaft could be cooled and dried by means of refrigerators, to a temperature suitable for men to work in.

A Study of Shoveling as Applied to Mining—II*

By G. TOWNSEND HARLEY
Tyrone, New Mexico

SYNOPSIS—*Where the material mined must be moved over a certain distance it is advisable to employ a car. For best results this should be placed about 4 ft. from the pile to be moved. The shape of shovel used and its length of handle have a decided effect on the amount of shoveling done. The system of payment for work performed has a strong influence upon the success of any scheme for increasing the individual efficiency of miners or mine laborers.*

IN FIG. 28 is shown the number of shovels per minute thrown into a car for any length of job. In this series of tests the ore was thrown a horizontal distance of 4 ft. into a mine car 42 in. high; 4 ft. seems to be the best distance to maintain between car and ore pile, for a man to work to the best advantage. Due to the height of the car, the capacity of a shoveler is decreased, as compared to his capacity in shovels per minute, when loading into a wheelbarrow. This decrease in shoveling speed amounts to about 8 per cent. per foot of height. The best type of car for a shoveler to use holds about a ton of ore, is as low as is consistent with good design, certainly not over 45 in. in height, and is equipped with roller bearings, which should be kept in the best of condition. Cars much larger than this are too hard to tram and cars much smaller use up too much of the shovelers' time tramming back and forth.

Fig. 29 shows the effect of having to throw the ore a greater distance than 4 ft. into the car, for a given length of job, using a No. 4 D-handle shovel. For every additional foot between the car and the ore pile, the height of the car remaining constant, the decrease in shoveling speed amounts to about 3.6 per cent.

In Fig. 30, Chart A shows the time consumed in tramming, dumping, and returning with the car, over various distances. Chart B shows the average tramming speed that will be developed for any distance over which the ore has to be conveyed.

Fig. 31*A* shows the amount of rest required for various lengths of jobs under constant conditions of length of tram, and distance and height through which the ore is thrown by the shoveler. For any length of job, as the length of tram increases, the amount of rest needed is increased, as shown in Chart B. Both of these lines, however, are quite flat, for a man can get nearly enough rest as he returns each time with the empty car.

Fig. 32 shows the tonnage to be expected of a man mucking into a car and tramming a constant distance, for various lengths of jobs. It will be noticed that the economic shoveling day is between 7 and 8 hours and that the maximum average results to be expected of a mine shoveler under the given conditions have probably been reached.

Fig. 33 is made up for a uniform shoveling day of 6 hours and 12 minutes and shows the tonnage to be expected under average shoveling conditions for any distance that the ore must be thrown or trammed. The line representing the tonnage to be expected of a man with a wheelbarrow may not be entirely correct, especially as the length of tram increases. It is thought that up to 15 ft. the line is about correct but that it may slope off a little too rapidly beyond this point. On the other hand, the wheelbarrow is generally used where neither direct shoveling nor the use of a car, with its attendant track expense, etc., is feasible; consequently, the wheelbarrow is always at work under adverse conditions in a stope and no improvements over the results here tabulated are to be expected. The writer thinks that the work with a wheelbarrow in a stope has been closely approximated but that a greater efficiency could be obtained in a clear and unobstructed passage, such as a drift. The calculation of the tonnage expected when tramming either with a car or

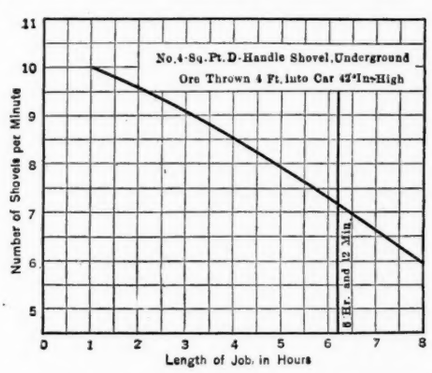


FIG. 28. EFFECT OF LENGTH OF JOB ON NUMBER OF SHOVELS PER MINUTE

wheelbarrow, for any length of job and distance trammed, is expressed in the following formulas:

Let W = Weight of load on shovel, in pounds;
N = Number of shovels per minute, Figs 24 and 28;
P = Per cent. of time actually shoveling, Figs. 26 and 31;
L = Length of job, in minutes;
T = Total tonnage shoveled;
a = Time to load one car or wheelbarrow;
b = Time to tram and dump one car or wheelbarrow, in minutes, Figs. 25 and 30;
c = Load on one car or wheelbarrow, in pounds.

*Concluding installment of a paper presented before the February meeting of the American Institute of Mining Engineers. The first part of this article appeared in *Coal Age*, Feb. 13, 1919.

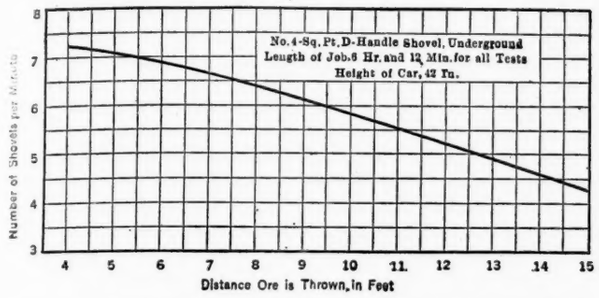

No. 4-Sq. Pt. D-Handle Shovel, Underground
Length of Job, 6 Hr. and 12 Min. for all Tests
Height of Car, 42 In.
Number of Shovels per Minute
Distance Ore is Thrown, in Feet

FIG. 29. EFFECT OF DISTANCE THROWN ON NUMBER OF SHOVELS PER MINUTE

Then

$$\frac{c}{W \times N} = a \qquad \frac{\left(\frac{L}{a+b}\right) \times c \times P}{2000} = T$$

Example 1.—What will be the total tonnage handled, using a 21-lb. shovel and a wheelbarrow, and tramming the ore 20 ft. for a job of 5 hours duration?

It is necessary first to find the time required to load one wheelbarrow, or

$$a = \frac{315}{21 \times 9.3} = 1.61$$

then the total tonnage handled is

$$T = \frac{\left(\frac{300}{1.61 + 0.56}\right) \times 315 \times 0.88}{2000} = 19.5$$

Example 2.—What tonnage will be handled in 6 hours and 12 minutes, using a car of 1-ton capacity and a shovel of 21-lb. capacity, tramming a distance of 100 ft.? As the time required to load one car is $\frac{2000}{21 \times 7.2} = 13.3$; the total tonnage handled is

$$T = \frac{\left(\frac{372}{13.3 + 2.43}\right) \times 2000 \times 0.73}{2000} = 17.23$$

To determine the relative wearing qualities and the cost per ton for supplying the men underground with new shovels, different places in the mines were equipped with different makes and styles of shovels and the results carefully noted. At frequent intervals, these shovels were measured to detect the wear of the blade, and checked up to see that all were being used in the proper places underground; the tonnage coming from each place and the number of shovelers employed were also noted. Table III gives the results obtained with the different classes of shovels.

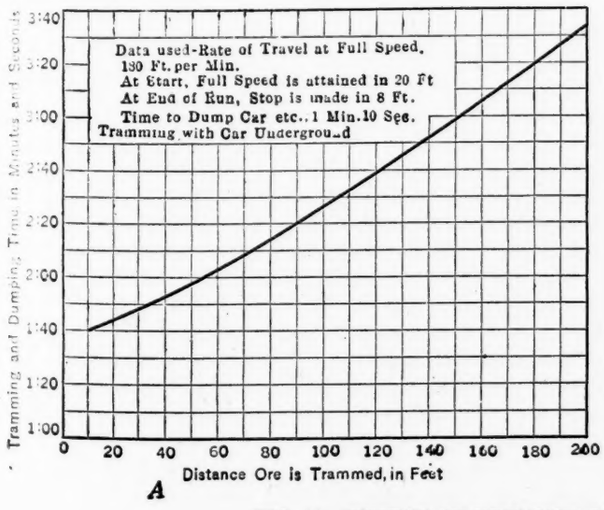
The shovels made of chrome-nickel and special steel were excellent implements but the special steel shovel was considerably heavier than the other. Cracks developed along the form line of the chrome-nickel steel blade, on each side, but these did not impair the shovel's usefulness. The blades of the three other shovels bent easily with rough usage; while the blade made of extra light carbon steel wore very rapidly and the edges curled up almost immediately. The No. 2 scoop was used until its capacity had been reduced 25 per cent. and the No. 4 shovel, until its capacity had been reduced 9 per cent. The cost of shovel per ton handled includes the cost of the shovel, freight, supply-house handling, handling new shovels into mine, and disposal of worn shovels. We had hoped to be able to detect a difference in the man efficiency on account of the different styles and weights of shovels in use at this time, but owing to the constantly changing conditions in the working places selected for the trials, no conclusive evidence was available.

The wearing quality of any shovel used on an iron sheet varies from 74 per cent. to 86 per cent. of the wearing quality of the same shovel on a wooden mat, the average being 82 per cent. The wearing quality of a shovel on a rough bottom is about 90 per cent. of that on a wood mat. These figures are based on about 50 observed shovels underground.

TABLE III. SCHEDULE OF WEAR OF SHOVELS

		—Tonnage Handled by Blades Made of—			
Type of Shovel	Used on	Chrome-nickel Steel	Secret Composition Steel	Common Carbon Steel	Extra Light Carbon Steel
No. 2 scoop	Iron sheet	1220	950	750	.....
No. 2 scoop	Rough bottom	.....	.....	.....	.....
No. 2 scoop	Wooden mat	1500	1100	900	.....
No. 4 shovel	Iron sheet	990	770	620	250
No. 4 shovel	Rough bottom	1075	870	.....	.....
No. 4 shovel	Wooden mat	1168	1000	730	340
Gage of steel in blade		15	13	14	16
Cost of shovel per ton handled, cent.		0.0015	0.0018	0.0019	0.0026

Tests were conducted with square- and round-point shovels varying in size from No. 2 to No. 6 and with standard No. 2 scoops, to determine what size of shovel was best adapted to the work. For short jobs of less than 4 hours' duration, the No. 2 scoop and the Nos. 5 and 6 shovel were slightly the best from the standpoint of tonnage handled; but for jobs requiring more than four hours for their completion, the No. 4 shovel was greatly superior, see Fig. 22. From the standpoint


Data used-Rate of Travel at Full Speed, 130 Ft. per Min.
At Start, Full Speed is attained in 20 Ft
At End of Run, Stop is made in 8 Ft.
Time to Dump Car etc., 1 Min. 10 Sec.
Tramming with Car Underground
Tramming and Dumping Time in Minutes and Seconds
Distance Ore is Trammed, in Feet
A

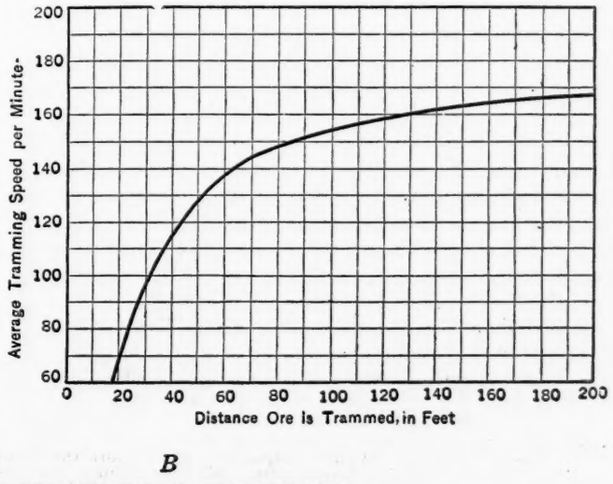


FIG. 30. EFFECT OF DISTANCE ON TIME AND SPEED OF TRAMMING

of "number of shovels per minute," work with a scoop is at all times slower than with a No. 4 shovel, see Fig. 18, and as the day progresses the percentage of time required for resting becomes greater with the scoop than with the shovel, see Fig. 20. The result is that although for short work periods, the larger capacity of the scoop brings the total tonnage handled above that of a No. 4 shovel, for long periods the increased amount of rest required when handling the heavier load serves to put the No. 4 shovel considerably in the lead as a tonnage mover. With shovels smaller than the No. 4, the number of shovels per minute was not increased, and the amount of rest required was not decreased enough to make the smaller shovel superior for any working period. It may be stated as a generalization, that for shovels smaller than the 21-lb.-load shovel, the tonnage handled per shift is approximately directly proportional to the shovel capacity; that is, if a man using a No. 4 shovel will handle 26 tons in an 8-hour shift, with a No. 3 shovel which holds 91 per cent. of the load of a No. 4 shovel, he would be expected to move about 24 tons a shift. If the increased cost of shoveling with a smaller shovel, or one that has been worn, is balanced against the cost per ton of putting a new shovel underground and discarding the old one, it will indicate the economic limit of wear of the shovels in use. We have, for the present, rather arbitrarily selected as the limit a shovel of size No. 4, which has been worn to about 12 in. in length, or roughly a 9 per cent. to 10 per cent. reduction of capacity. The lift of a shovel is important. By "lift" is meant the amount of rise in the handle just behind the blade. A handle that has not much bend in it at this point, but which goes off straight is said to have a low lift, while one that arches steeply is said to possess a high lift. To work with a shovel having a low lift the man must stoop down farther each time to take a grip on his shovel after it has penetrated the mass, and the added movement takes longer, and requires a greater effort to lift the weight of the body and the load through a greater space than with a high-lift shovel. As a result, more rest is required in the course of a day. With a very low lift, the shovel is not well balanced and there is a tendency for it to turn over in the hand, especially if it is not loaded evenly. With a high lift, the man does not have to stoop so far to grasp his shovel, the amount of rest period is decreased, and the loaded shovel is better balanced, because its center of gravity is well below the line of the handle. A lift of 8 in. is the best, as with greater lifts the awkwardness of the throwing movement is considerably enhanced. The height of the end of the handle above the floor when the shovel blade is flat on the floor is of considerable importance, too; this is the measurement that the manufacturers call the "lift." In a short-handle shovel, the end of the handle should strike just above a man's knee, a height of 23 in., to give the most effective effort in penetrating the mass. With a long-handle shovel the height should be the same at a distance back of the blade corresponding to the length of the short handle.

It is an advantage to have the weight of the shovel as low as is consistent with good material and length of life. Increasing the weight of the shovel slows up every motion involved in shoveling and increases the amount of resting required. However, it is not wise to go to extremes in the matter, as a very light shovel does not possess the strength and wearing qualities, and the cost of constant replacement is greater than the advantage gained in shoveling speed. In a personal communication, Frank B. Gilbreth says: "The 21-lb. load refers to shoveling any kind of material anywhere, above ground or below ground, and this is the live load upon the shovel and does not include the weight of the shovel. I make this statement after having asked this question of Mr. Taylor. Obviously it would have been better if the data had been obtained on the basis of having the load, live and dead, combined in one figure."

As we lacked information, we assumed that Mr. Taylor experimented, at least in part, with stock shovels, which weigh about 6 lb. in the No. 4 size. Our experiments were conducted with shovels of both regular and special design, varying in weight from 4 lb. and 10 oz. to 6 lb. and 5 oz., and we found that a shovel weighing between 5 lb. and 8 oz. and 5 lb. and 10 oz. gives the greatest per man capacity. This is a total combined live and dead weight of 26 lb. and 8 oz. to 26 lb. and 10 oz. A shovel of this weight can be made quite sturdy, the gage of blade being No. 15 of some composition steel and the handles of best selected XX second-growth northern white ash. With heavier shovels, there is a distinct falling off in capacity; while for lighter shovels, although we could detect no difference in capacity, the wearing quality was poorer, due to lack of strength.

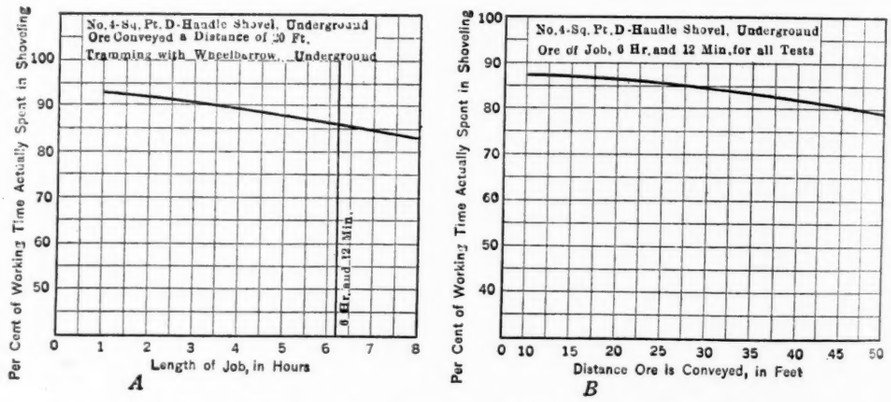


FIG. 31. REST PERIOD REQUIRED FOR VARIOUS CONDITIONS OF WORK

The use of the scoop is not advocated except where the material to be moved is so light that the scoop holds only 21 lb. Even for short jobs its use offers only a doubtful advantage, see Fig. 22. For shoveling on any sort of a mat or platform, the square-point shovel is the better; while for scraping down and working on a rough bottom, the round-point shovel should be used. Where there is plenty of room for men to work, the long-handle shovel of both square- and round-point pattern is superior to the short-handle. This is

true for all distances and heights to which the ore has to be thrown, and the farther or the higher the ore has to be thrown, the more pronounced is the superiority of the long-handle type.

D. J. Hauer says that where men are working in a free space they can do, on an average, 10 per cent. more work with a long-handle shovel than with the short-handle; that the limit of throw, taking only one step, is 12 ft. with a long-handle shovel and 9 to 10 ft. with a short-handle shovel. We have checked Hauer on these points and find his statements on the relative efficiency of the two types of shovels to be substantially correct; but we found that it is economy to throw as far as 12 ft. with a short-handle shovel and 14 ft. with a long-handle. Unfortunately, however, most working places underground are restricted in area and it is necessary to use the short-handle shovel. Where one man is shoveling in a drift, or one to each set of timber in a stope, the long-handle shovel can be used to advantage. Where men are working 2½ to 3 ft. apart, a short-handle shovel should be used. According to D. W. Brunton and J. A. Davis, in U. S. Bureau of Mines' *Bulletin* No. 57, the minimum spacing of men working side by side in a drift should be 2.5 ft. Calling the performance of a square-point shovel on a wooden mat 100 per cent., the efficiency of a square-point shovel working on a rough bottom is only 60 per cent. while with a round-point shovel an efficiency of about 70 per cent. may be maintained.

Best Shovel for Mining Work

Fig. 34 shows the design considered best adapted to mining work. The blade should hold 21 lb. of broken ore as an average load. The approximate dimensions of blades for various ores are given in Table II; the dimensions on the illustrations are for Burro Mountain ore. Both the square- and the round-point blades should be of standard shape, of No. 15 gage at the point, and of such composition that the shovel will handle not less than 1100 tons of medium-hard ore when shoveled off a wooden mat. All blades should be of the plain back type without rivets, the back strap being welded to the blade. Only best-grade, second-growth, northern white ash should be used for the handle, which should be bent to the shape and dimensions shown. On short-handle shovels, the Dirigo, or split D, handle is preferred, as it is much stronger than the ordinary D handle.

A right-hand shoveler throws the ore from him from his right side. When using a short-handle shovel, he grasps the D handle with his left hand, the cross of the D being in the palm of the hand to obtain a good hold, and with the right hand takes a grip on the handle just back of the straps. Standing close to the material to be shoveled, with feet placed as in Fig. 35, he bends his back, shoulders and knees, and assumes a squatting position so as to remain well balanced on his feet. The left hand grasping the D handle rests against the left leg just above the knee, and the right arm below the elbow rests on the right leg. Without moving the feet, the whole body is lunged forward from this position, thrusting the shovel blade forcibly under the muck pile, and heaping it full.

To elevate the full shovel, the knees, back and shoulders are simultaneously straightened, the feet remaining motionless. To throw the ore into a car, after the shoveler has reached a nearly erect position, the shovel is raised farther by drawing up the arms, the left hand acting as a moving fulcrum, and the load is cast directly over the right shoulder without turning the body or moving the feet. To cast in a horizontal direction for any distance, the body must be turned part way around to the right and a short step made in the direction of the throw; the load is cast by a swing of the arms, first slightly backward to obtain momentum and then forcibly forward to deliver the load.

When using a long-handle shovel, a right-hand man grasps the shovel close to the end of the handle with the left hand and places the right hand just back of the straps. The feet are placed as in Fig. 36 and the body assumes a crouching position with knees bent and the right elbow resting on the right thigh just above the

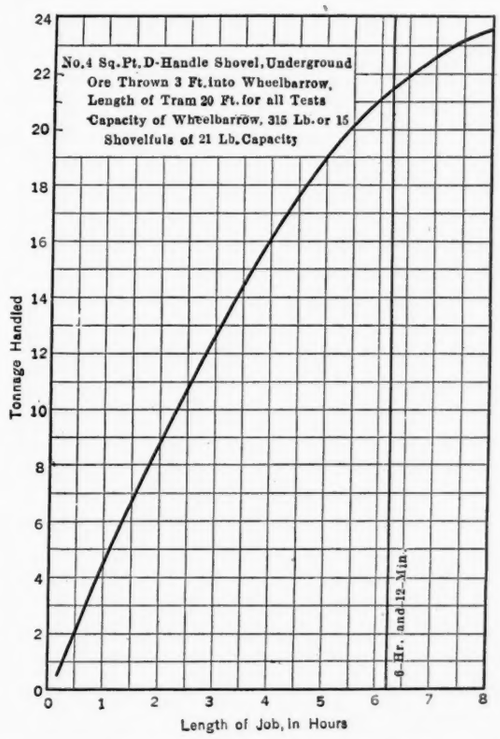


FIG. 32. SHOWING CAPACITY OF A SHOVELER USING A CAR FOR VARIOUS JOBS

knee. The handle of the shovel lies across the left thigh close to the groin and the left hand falls into position against the body near the waist. With a lunge of the body the shovel is then thrust under the mass of ore without moving the feet. To lift the mass on the loaded shovel, the back and shoulders are straightened and the load is brought up by using the left thigh as a fulcrum, over which the shovel handle works as a lever; the knees are then straightened to bring the shoveler into an erect position where the ore is cast directly over the right shoulder into a car as with the short-handle shovel. To cast the load horizontally, a turn to the right is made and a short step in the direction of the throw, exactly as with the short-handle shovel.

It is surprising what a small proportion of the men underground know how to use a shovel to the best advantage, and all sorts of tricks are resorted to in an

effort to lighten the work. Among these are: Taking less than a shovelful each time, using the foot in an effort to force the shovel into the muck pile in the manner of using a spade, skimming a thin layer of loose dust off the sides of the muck pile instead of energetically penetrating the mass to obtain a full shovel load, not holding the shovel properly, and taking two or three steps with each load.

To obtain the highest shoveling efficiency underground, every man hired as a shoveler should be in a particular stope or working place that is directly in charge of a shoveling boss. This boss should have had a large experience in shoveling, have learned correct shoveling methods, and should be able to instruct men and gain their confidence. Each man should be taught: (1) The necessity of using the correct type of shovel for any given purpose; (2) the proper way to handle a shovel; (3) the range of usefulness of wheelbarrow and car; (4) the advantage of using a platform to shovel from; when shoveling has progressed beyond the platform time should be taken to advance the boards or iron sheet and to scrape the broken ore forward on to the platform; (5) the mass of broken ore should be thoroughly loosened with a pick; it is waste of effort to try to shovel material that has become packed; (6) shoveling should be done at a good steady pace, the speed depending on the length of job; it is waste of time and energy to try to rush through the work; (7) in addition to the amount of rest inherent in the work itself—that is, the rest gained while picking down, tramming, etc.—definite rest periods should be maintained during the day. When each man has been thoroughly instructed in the methods of shoveling, he should be placed in general run-of-mine work among the more experienced shovelers, so that another new man make take his place for instruction.

Shovelers Should Work in Pairs

When possible to avoid it, a shoveler should never be made to work alone. Shovelers working in pairs produce the best results, as they set the pace for one another and compete to a large extent; besides, any laxness can be detected almost at once. Shovelers should be placed in groups of two, four, six, etc., so that the men can work in pairs. It is best not to have more than four men in any group, as with larger groups it is hard to watch the work of each man separately and they try to put the work off on one another. Best results are always obtained when the tonnage shoveled by each man, or small group of men, can be accurately measured at the end of every shift. When men are shoveling in a stope where there is room, they should be so placed that each can use a long-handle shovel; where the area is restricted, a short-handle shovel should be given to them and they should be placed so that a right-hand and a left-hand man can work together.

The ideal shoveling day is the period during which a man can rest at stated intervals and can produce the maximum tonnage by working at a steady pace for the full period, and yet not wear himself out, so that his health is impaired. It is obvious that a steady working pace for the full period is physically impossible unless the rest periods are excessive, in which case the total tonnage handled falls off; in other words, a man cannot do a good day's work and leave the job feeling as fresh as when he arrived. In all of the tests, the shovelers showed a decreasing efficiency, as the day advanced; rest periods brought up the efficiency, but after each successive rest period the efficiency did not advance to quite the same point as after the preceding period, and at the end of the shift it had reached its lowest ebb. Much work can still be done on this point, but after considering the amount of rest that is inherent in the work itself and the amount of added supervision necessary to maintain shoveling on a scientific basis, the tentative statement is made that, in addition to the lunch period, there should be two 10-min. periods of complete relaxation, one midway between the beginning of the shift and lunch time and the other midway between lunch and quitting time.

In all discussions of efficiency methods and wage payments, one fact must be recognized: unless a man feels that he is to be well paid for his work, he is going to use every subterfuge to keep those in charge from knowing just how much he is capable of doing. Almost without exception the workman will be most interested in his wage; if he can earn the same wage with less effort he will do so, and if an increase depends directly on his extra effort he will work harder. It is not the purpose to discuss wage payment and benefit work except in so far as the relation of wages to an efficiency campaign must be clearly recognized; but it is necessary that some thought be devoted to the method applying these standards so as to obtain the best results from day to day without antagonizing the men.

Fundamental Laws of Management

Three fundamental laws of management are: (1) The man must be contented with his surroundings and conditions of work; (2) he must have confidence in the desire of the men over him to be fair in their dealings; (3) the payment for the work done must be proportionate to the performance.

It must be obvious to any one that such things as accident insurance and compensation, good hospital service, old-age pensions, steady work for old and faithful employees even in times of financial stress, good housing and living facilities, improved sanitary conditions, good educational features, such as schools and libraries for both old and young, plenty of entertainment, such as a club, moving pictures, and lectures, and a sincere interest in the men by the management, tend to make the men happy and contented with their surroundings and to put them in a receptive mood for any bonus and efficiency systems that may be contemplated. Unless the men are contented, it is not possible to attempt to increase the efficiency by scientific study, as the men will at once become antagonistic to the time-study man and the efficiency engineer and will do all they can to mislead them.

No campaign for scientific management will be successful as long as the men feel that the company is trying to determine what each man can do merely to cut his wages and to make him work harder for a wage only slightly in advance of his old rate. The company should make each man understand that it hopes to determine what a fair day's work constitutes and that for a fair day's work it is ready and willing to pay a fair day's wage and to reward any ambitious and energetic man who does more than the average, by paying him

accordingly. The company must supply the best tools for the work and have the conditions such that the man can work to the best of his ability.

When first installed, a schedule of payment should always be a little too low rather than too high; then as the men fail to make a good bonus the schedule can be increased from time to time as occasion requires. A schedule should never be lowered when once it has been put into effect, as the men will immediately become suspicious of the intentions of the management. The new system should be introduced by applying it to one man at a time, picking out only those who are willing; after several of the best men are working under it, with demonstrated advantage to themselves, most of the others will volunteer to come under the new system. In general, it takes two or three years to institute a new system and to put it on a successful operating basis without making the men suspicious, and the utmost patience and tact is necessary at all times.

The Phelps-Dodge Corporation has not as yet introduced a system of payment other than the regular daily wage and, in the case of development work, the contract system, in which the shovelers share by receiving a higher wage than the men in the stopes.

Daily Wage—In the daily-wage system, the supervision is generally held at a minimum and the men have an ideal opportunity, and use it to the full extent, to do as little for their pay as possible. It is a system of payment that is by no means adapted to efficiency methods, as it puts the men into large classes and takes no account of individual effort.

Task Work—The task-work system merely designates a piece of work to be done after which the laborer may go home. In some cases the laborer gets a full day's pay for the period he works, while in others he divides with the company the amount of wage for the time he saves. In either case his only reward is shorter hours; he does not make any more by working harder, in which respect the system falls short.

Profit Sharing—The men receive a set wage for a day's work and at intervals (quarterly, half yearly or yearly) a certain proportion of the company's profits are divided among them, either according to wage rates or to length of time in the service of the company. This system has the disadvantage of not giving immediate reward to the men for the work they are supposed to do in return, and as a result their interest is not stimulated.

Piece Work—In the piece-work system, the men receive a set price per ton handled or per foot advanced, etc. The system is an ideal one when the conditions of work vary only within narrow limits, but underground it has grave drawbacks. When a piece-work price or a contract is given, often the workman will make too much

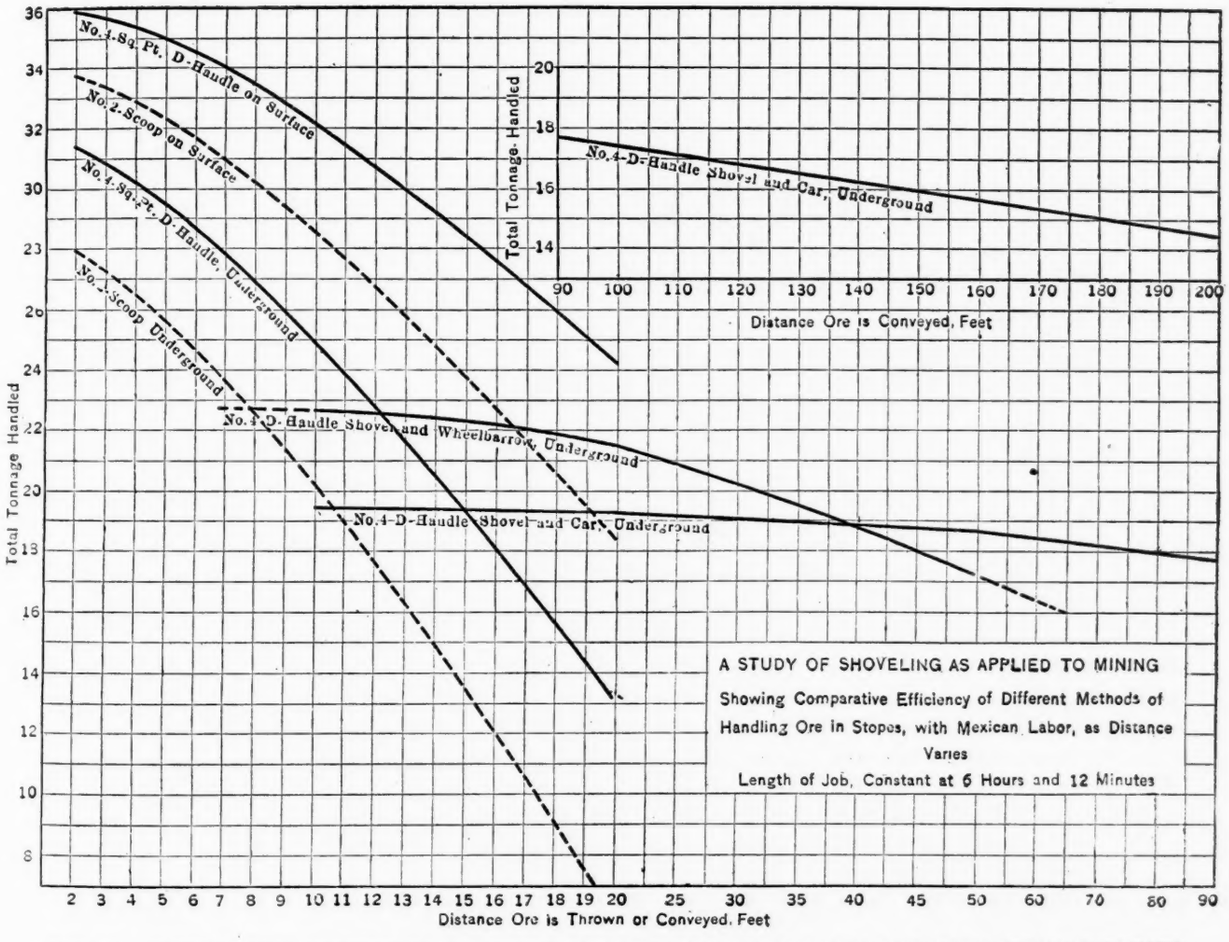

No. 4 Sq. Pt. D-Handle on Surface
No. 2 Scoop on Surface
No. 4 Sq. Pt. D-Handle, Underground
No. 2 Scoop Underground
No. 4 D-Handle Shovel and Wheelbarrow, Underground
No. 4 D-Handle Shovel and Car, Underground
Total Tonnage Handled
Distance Ore is Thrown or Conveyed, Feet
No. 4 D-Handle Shovel and Car, Underground
Total Tonnage Handled
Distance Ore is Conveyed, Feet
A STUDY OF SHOVELING AS APPLIED TO MINING
Showing Comparative Efficiency of Different Methods of Handling Ore in Stopes, with Mexican Labor, as Distance Varies
Length of Job, Constant at 6 Hours and 12 Minutes

FIG. 33. COMPARATIVE EFFICIENCY OF DIFFERENT METHODS OF HANDLING ORE AT VARYING DISTANCES

money or not enough; the price set is seldom one that enables the man to make what the company thinks is fair. In the first case, the company is tempted to cut the price; in the second, it is forced to help the man out by giving him enough to live on. Many unions forbid the piece-work or contract system. The harm in cutting rates is largely caused by poor judgment on the part of the management in first setting the rates. The standards are not based on scientific data, but on the previous best records, an ordinary try out, or on the foreman's off-hand estimate of what should be done, all of which are generally from 50 to 150 per cent. too low.

Conditions underground vary to such an extent from day to day that no true contract or piece-rate system can be entirely fair, and either the man or the company is bound to suffer. Just as soon as the men in charge of such a system try to anticipate the conditions in making contracts, the men raise the cry of favoritism and become dissatisfied. Such a system presents great opportunities for evil in that the effort to equalize results actually does produce favorites and offers a field for a dishonest man to profit from the laborer.

TABLE IV. BONUS PAYMENTS TO BE APPLIED TO SHOVELERS. BASE RATE OF $3.75 PER DAY IS GUARANTEED TO MAN

Distance Ore Is Thrown or Conveyed, Ft.	Shoveling into Chute: Average Tonnage Expected	Shoveling into Chute: Payment Rate for Average	Shoveling into Chute: Bonus per Ton Above Average	Shoveling into Wheelbarrow: Average Tonnage Expected	Shoveling into Wheelbarrow: Payment Rate for Average	Shoveling into Wheelbarrow: Bonus per Ton Above Average	Shoveling into Car: Average Tonnage Expected	Shoveling into Car: Payment Rate for Average	Shoveling into Car: Bonus per Ton Above Average
2	31.5	$0.120	$0.130	....	.....	.....	....	.....	....
3	31.0	.121	.131	....	.....	.....	....	.....	....
4	30.0	.125	.135	....	.....	.....	....	.....	....
5	29.5	.128	.138	....	.....	.....	....	.....	....
6	29.0	.130	.140	....	.....	.....	....	.....	....
7	28.0	.134	.144	22.7	$0.165	$0.175	....	.....	....
8	27.0	.139	.149	22.7	.165	.175	....	.....	....
9	26.0	.144	.154	22.7	.165	.175	....	.....	....
10	25.0	.150	.160	22.6	.166	.176	19.5	$0.192	$0.202
11	24.0	.156	.166	22.6	.166	.176	19.5	.192	.202
12	23.0	.163	.173	22.6	.166	.176	19.5	.192	.202
13	22.0	.170	.180	22.5	.167	.177	19.4	.193	.203
14	20.0	.188	.198	22.4	.167	.177	19.4	.193	.203
15	19.0	.197	.207	22.3	.168	.178	19.4	.193	.203
16	18.0	.208	.218	22.1	.169	.179	19.4	.193	.203
17	17.0	.220	.230	22.0	.170	.180	19.3	.194	.204
18	16.0	.235	.245	21.8	.172	.182	19.3	.194	.204
19	14.0	.268	.278	21.6	.173	.183	19.3	.194	.204
20	13.0	.290	.300	21.5	.175	.185	19.3	.194	.204
25	....	.....	.....	21.0	.178	.188	19.2	.195	.205
30	....	.....	.....	20.3	.184	.194	19.1	.196	.206
35	....	.....	.....	19.6	.191	.201	19.0	.197	.207
40	....	.....	.....	18.8	.199	.209	18.9	.198	.208
45	....	.....	.....	18.0	.208	.218	18.8	.199	.209
50	....	.....	.....	17.3	.217	.227	18.7	.200	.210
60	....	.....	.....	16.4	.228	.238	18.4	.204	.214
70	....	.....	.....	....	.....	.....	18.2	.206	.216
80	....	.....	.....	....	.....	.....	18.0	.208	.218
90	....	.....	.....	....	.....	.....	17.8	.210	.220
100	....	.....	.....	....	.....	.....	17.5	.214	.224

Bonus System—The bonus system guarantees a fair wage to the man for everything that he does up to a certain standard performance and beyond that a bonus is paid for each unit of work done. In my opinion, it is an ideal system for getting around all the difficulties and uncertainties that exist in mining. To install such a system requires much preliminary study, and unremitting care during its existence, but if carefully carried out it creates a bond of sympathy and good feeling between the men and the company that is worth far more than the expense. It simply means that for any class of work the company must determine through the medium of past performance and time study what an average day's work shall consist of and must guarantee the men a fair day's wage for that amount of work. In order to keep the men interested and up to this standard, the company must say that it is ready and willing to pay for any work done in excess of the required standards.

The wage in force at the present at the Burro Mountain mines for Mexican shovelers is $3.40 a day. Assuming that this is a fair wage for this class of labor, to put the men in the proper frame of mind to take kindly to the bonus system, the wage should be raised to $3.75 a day, an increase of 10.3 per cent.; this wage will be paid to them whether they make the required tonnage or not. If any man makes the tonnage required of him, his wage may be raised to $4 for that shift, an increase of 17.6 per cent. above the $3.40 rate, although this has not been designated in Table IV. If he produces anything over the required amount, he should be paid a bonus per ton, depending on the original task allotted to him. In order to make an increase of 50 per cent. over his old $3.40 rate, a shoveler will have to produce between 25 and 30 per cent. more than his allotment. Experience has shown that when a laborer receives an advance in wages of more than about 50 to 80 per cent. above a fair wage, he tends to become shiftless and the increase does him more harm than good.

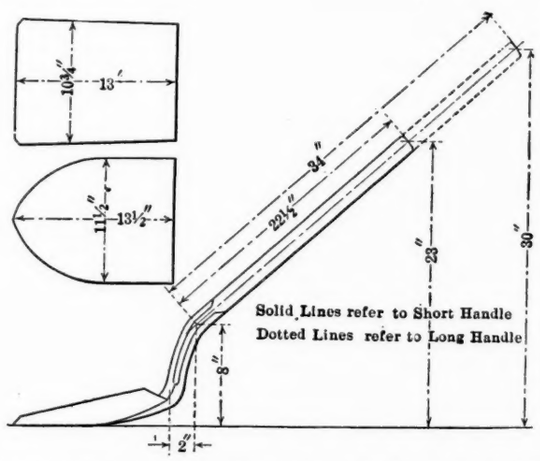


FIG. 34. DESIGN OF SHOVEL BEST ADAPTED TO MINING WORK

Fig. 33 shows that under good working conditions a laborer moving ore 20 ft. should use a wheelbarrow, and should move 21.5 tons. According to Table IV, this man will receive $3.75 a day for any work up to 21.5 tons, or at the rate of $0.175 a ton. If he reaches the required 21.5 tons, his wage will become $4, or at the rate of $0.185 a ton, and for every ton over the required amount, he will receive $0.185 a ton. In each individual case, the man setting the standard of work should make sure whether there are any interfering elements that will prevent the man making the standard tonnage, in which case he should make a fair reduction.

In 1917, in a stope with raises spaced 25 x 65 ft. from which was mined 145,000 tons, the shovelers averaged 8.5 tons a man, with wages at $3.40 a day. This shoveling cost $0.33 a ton, assuming that the men were on other work for 17.5 per cent of the day. Charts show that under the new system these men should have averaged 22.9 tons a man, for which they would have received $4 a day. This would be an average shoveling cost of $0.175 a ton, or a gross saving of $22,475 for the year. Out of this gross saving would have to come

the cost of, say, five special men, at an average salary of $160 a month, or a total of $9600 a year, to take care of this branch of the work. This sum deducted from $22,475 leaves a saving of $12,875, or a total shoveling cost of $0.239 a ton.

If, under the new system, the men consistently fail to make bonuses, it is either the company's fault or the men's fault. If it is the fault of the company, the

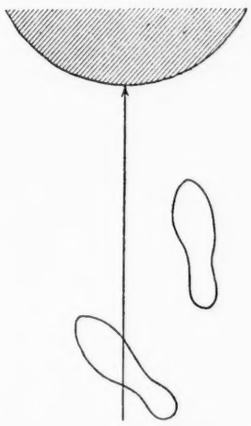


FIG. 35. POSITION OF FEET OF RIGHT-HANDED MAN USING SHORT-HANDLE SHOVEL

standard may have been set too high on account of a faulty analysis of the time-study figures. The men may not be receiving the proper shovels to work with; or the men in charge of the work may not be making fair reductions from this standard, when working conditions are poor. If the men are to blame, either they are not physically fit to be shovelers, in which case they should be tried out at some other work, or they are suspicious of the company's motives, which would lead one to suspect that the system had been introduced too hastily, or that the men have organized to force the company to raise the rate of payment or to lower its standards.

Summary and Conclusion

Shoveling ore cost so much at Tyrone during the year 1917 that it was deemed advisable to conduct tests to see where the fault lay. These tests were in the nature of time studies and extended over a period of nearly a year. No data were available on this work to supply a starting point, so it was necessary to begin in a very elementary way, to find out the capacity of the average Mexican laborer.

To obtain a basis for comparison, it was necessary to determine the capacity of various types and sizes of shovels, so as to know whether the 21-lb. load was the best load underground as well as on the surface. A list of essential factors influencing shoveling was also made out during the course of a short series of preliminary time studies, and the motions involved in shoveling were analyzed and subdivided for convenience in studying. The necessary forms and record sheets were also decided upon at this time. A second short series of tests was then conducted on the surface, so as to be able to estimate the negative effects of underground work on the shovelers, and to minimize, as far as possible, the need for studying obviously poor types and sizes of shovels under the difficult conditions to be encountered in the mine.

The test work underground consumed by far the greater proportion of the time and was divided into three series: Shoveling directly into a chute; shoveling into a wheelbarrow and tramming to a chute; and shoveling into a car and tramming to a chute. In each series the following points were determined for various lengths of time worked: Number of shovelfuls handled per minute, effect of distance thrown on shoveling speed, amount of rest required, amount of time consumed in tramming and dumping, proportion of working day occupied in shoveling, total tonnage handled during various working periods, effect of distance on tonnage handled during the day.

These tests showed that the design of the shovel has a marked effect on the shoveling efficiency and that with the proper weight and size of tool the man's efficiency will be increased in spite of himself. It was demonstrated that a man handling a total load of 26 lb. and 8 oz. did the greatest day's work, other things being equal, and that this load is divided into a live load of 21 lb. and a shovel weight of 5 lb. and 8 oz. A shovel weighing 5 lb. and 8 oz. made out of the best composition steel gives excellent service, and a lower cost per ton than a shovel having a lower first cost.

Further marked increases in shoveling efficiency are to be gained by instructing the shovelers in the proper methods of using a shovel, a thing that few laborers know in spite of the fact that they may have been shoveling for a living for years.

Probably the most important part of all efficiency work lies in the wage that is paid to the men, the manner of paying the wage, and the feeling of confidence and good will that exist between the men and the company. Various types of wage payment are briefly discussed and the conclusion is reached that the bonus system in some form, if properly handled and carefully watched with a sufficient number of specially trained men to instruct the laborers and keep them working

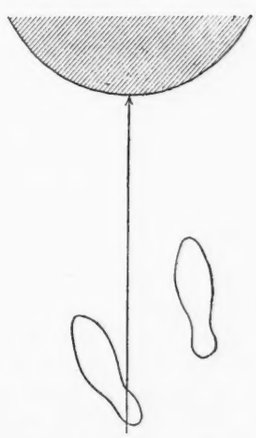


FIG. 36. POSITION OF FEET OF RIGHT-HANDED MAN USING LONG-HANDLE SHOVEL

to the best advantage, is the preferable system of payment. A bonus schedule is proposed as a starting point for the work and the benefits that will probably be derived from it are outlined, using some actual stoping experience as an example.

Scientific management systems applied to certain eastern factories have demonstrated conclusively that the efficiency of the average workman can be increased by

from 50 to 250 per cent. and that at the same time the men will receive better wages, will remain in better health, and will be happy and contented, while the company will actually produce its products at a lower cost.

F. W. Taylor, working at the Bethlehem Steel Co. plant several years ago, increased the capacity of the iron-ore shovelers from 16 to 59 tons per day per man, raised the men's wages from $1.15 to $1.88 a day, and at the same time decreased the operating cost from $0.072 to $0.033 per ton shoveled. The increase in shoveling capacity amounted to 269 per cent. Figures obtained at Tyrone indicate that the tonnage in at least one of the large stopes can be raised from 8.5 tons per man to 22.9 tons per man, an increase of 169 per cent., the wages can be raised from $3.40 a day to $4 a day, and the cost to the company reduced from $0.33 a ton to $0.24 a ton, after taking care of all extra supervision needed. In addition to this actual saving in shoveling costs, the overhead and general mining costs will be reduced per ton by mining a greater tonnage per man; and the other classes of labor such as machine miners and timber men will be able to do more work, as they will not be hampered and delayed by the shovelers to such an extent as at present.

Labor should not be given too much of an increase in wages over what is recognized as a fair living wage, as the men will at once tend to become shiftless and prosperity does them more harm than good.

The modern manager is beginning to see that the relation of standard times to the other features of organization is close and vital. The determination of the standard, or the shortest time, in which a job can be done, is the starting point for all work that has as its aim the establishing of an equitable wage system.

Charles Piez Talks to Engineers On Shipping Problems

The Engineers' Society of Northeastern Pennsylvania held its twenty-second annual banquet at the Hotel Redington, Wilkes-Barre, Penn., Feb. 5. About 390 persons were present, more than the banquet hall would accommodate. The toastmaster was Daniel R. Reese, and the guest of honor, Charles Piez, director of the Emergency Fleet Corporation and president of the Link Belt Co.

Mr. Piez made a most interesting address, completely justifying the work of the Emergency Fleet Corporation. He said that wages to ship workers had been increased to accord with the cost of living, but that it had been felt that it was questionable always whether the Macy board, which regulated the matter, would continue to be justified in making such adjustments, because there were large bodies of workingmen in the United States whose difficulties in meeting the high cost of living were not being, and could not be, so generously met. In fact these men were bearing the pressure of war conditions, whereas the shipbuilders were, by the frequent readjustments, managing to avoid feeling any of the pressure. Mr. Piez declared that the United States should write off about a billion and a half dollars as a war loss. Conditions were not favorable for economical production. Above all the wooden vessels were not really suitable for modern commerce. Such vessels could not be built to carry a deadweight of more than 3500 to 4000 tons. Such a load, when the coal supplied for going and returning was deducted, would be found inadequate for modern competitive conditions. The trouble was not that the ship was wood—a steel ship of the same size would be equally uneconomical—but being a wood ship it could not be made bigger.

He declared himself opposed to a merchant marine larger than would serve for the support of the increased navy. The figure he named was 12,000,000 deadweight tons. He declared that 25,000,000, as had been suggested, was altogether too large. He added that in order to operate the merchant marine with the wages demanded by the union and the working conditions specified by legislation it might be necessary for the nation not only to write off much of the money expended, but to guarantee that it would accept part of the losses of operation of any company which would undertake to sail the ships and provide the docking accommodations.

Con McCool, a one-time miner, delighted the audience by his witty stories and his clever impersonation of the men of divers nationalities engaged in a labor convention. The outgoing president read his report for 1918 and the placid G. F. Smith, ingoing president, delivered some extremely humorous remarks on his experiences at the Club of the Engineers' Society during his bachelor days. The Club much appreciated his dry wit.

There were at one time 43 blue stars in the service flag of the society, but three have turned to gold. They represent Lieut.-Col. Frank F. Duffy, who fell at Château-Thierry, Ensign Merritt H. Barnes and Captain Karl G. Van Sickle. Dan Hart, a Wilkes-Barre man, delivered an eloquent address in commemoration of their services, and preliminary arrangements were made for a memorial in their honor. The motion picture, "America's Answer," concluded the entertainment.

Colliery Notes

Miners often do not object to working in seams generating gas as it helps to work the coal. Another important thing in this connection is that the air is often better; the gas must be diluted by enormous volumes of air when given off in large quantities at the face.

An inside company man ran a small sliver in his finger and infection resulted because he did not have it dressed. The Bethlehem Steel Co. has an excellent rule covering such cases, which requires all the employees at its Bethlehem plant in event of any injury whatsoever to report at once to the physician in charge of such matters at the company hospital at the works.

The U. S. Bureau of Mines reports 76 men killed about coke ovens in 1917 compared with 45 in 1916, while the total number of men employed about ovens remained about the same—32,417 for 1917 and 31,603 for the preceding year. The fatality rate in 1917 was 2.14 per 1000 employees; in 1916 it was 1.32. The injury rate in 1917 was 188.59 per 1000 men employed, while in 1916 it was 153.49. The increase in accident rates is not necessarily on account of the work being more hazardous; rather it is due to the keeping of better records which more nearly represent true conditions.

BOOK REVIEWS

Where Differences Wait on Reason

REPORT OF ANTHRACITE BOARD OF CONCILIATION. Vol. VI, 363 pages; 6 x 9¾; no illustrations. James A. Gorman, secretary, Anthracite Board of Conciliation, Hazleton, Penn. Cloth Boards.

The volume of business transacted by the Anthracite Board of Conciliation will be appreciated when this record, covering a period from Apr. 1, 1916, to Mar. 31, 1917, is scanned. In a preface we are assured, however, that it does not cover all the activities of the board. "The members of the Board of Conciliation, acting pursuant to regulations, settled," says Mr. Gorman, "a large number of grievances in their respective districts, thus making it unnecessary to bring up these matters formally for action by the entire membership. In such grievances the parties directly interested were not required to appear before the board to give testimony. Grievances settled in this way are not recorded in this compilation of the work of the Board of Conciliation as the board in these compilations makes record only of the formal grievances which were taken up and acted upon by the whole body."

The number of grievances decided and withdrawn number 175, the registration numbers running from 361 to 569. Certain grievances being at the date of record neither decided nor withdrawn, the number recorded is reduced from 209 to 175, as noted. Cases were withdrawn for various reasons, "the chief of these being, compromise by parties to grievances, settlement direct, failure of interested parties to prosecute their cases before the board, complainants quitting the employ of the company and complainants requesting withdrawal of their cases."

Among other *causes celébres* was the case of the motor runners of the Hazleton Shaft Colliery vs. the Lehigh Valley Coal Co., where the motormen wanted to receive the same wages as were paid to oil-locomotive engineers at the same colliery and to motormen at other collieries. Another case is that of the contract miners of No. 23 Tunnel, Coal Brook Colliery vs. the Delaware & Hudson Co. relative to pay for lifting the bottom impurity or rock as part of the coal seam. There is also the case relative to the subletting of contracts for the loading of machine-mined coal known as Grievance No. 384 and entitled "Certain Employees vs. Delaware, Lackawanna & Western R.R. Co., Coal Department." The volume also reports the "Topping" dispute at the Short Mountain Colliery of the Susquehanna Coal Company.

In every man's life, in the life of every industry, in the life of every nation, there are only three choices—submit, arbitrate or fight. It is creditable to the coal industry of the anthracite region that the second course, which is the best of all, has been the course accepted. The bituminous coal industry has as yet no court of final appeal that is in any degree comparable with that long established in the anthracite region. Other industries also straggle far behind along the road over which the anthracite industry has traveled with winged feet.

Burning of Comminuted Coal in Industry

POWDERED COAL AS A FUEL. By C. F. Herington, Mechanical Engineer. Pages XII + 202 + 9 index; 5¾ x 9¼; 84 illustrations. D. Van Nostrand Co., 25 Park Place, New York, Publisher. Cloth boards. Price, $3 net.

Many are the inquiries on foot to ascertain the possibilities of powdered coal. Some of the emphasized disadvantages in the use of this fuel are merely superficial. We realize from the first that it is prepared coal, and therefore more costly than slack. We overlook the fact that the drying to 1 per cent. of moisture is not a costly performance. Every ton of coal burned, no matter what the conditions of burning, is desiccated that much, either before it is put into the furnace or after it is put in.

The work of drying is doubtless more troublesome when it is a separate operation, but theoretically, at least, the loss of heat is the same. Coal must always be dried in the burning. All that we call water vapor in the coal must be eliminated sooner or later. In the powdered-coal system it is eliminated in two stages, in the grate system in only one. In either case, out of the coal the moisture must be driven, and thermal units must be consumed in its expulsion.

Then, again, the powdered-coal system is prodigal in the cost of crushing but is frugal in the cost of stoking, though, of course, not more frugal than the mechanical stoker. Perhaps few realize how far the powdered-coal plant has monopolized the cement industry. According to C. F. Herington, "fully 90 per cent. of the Portland cement made in the United States is burned in kilns in which powdered coal is the fuel." In metallurgical processes powdered coal seems to have great advantages over oil.

The book gives information about the suitability of various coals for powdering, the machinery used in coal powdering, the feeding and burning of powdered coal, the use of powdered coal in the cement industry, in reverberatories, in metallurgical furnaces and under boilers. The developments in locomotive firing follow.

Then explosions of powdered coal are treated. The author seems to carry us back to the end of the last century. He appears anxious to make us think that coal dust, while it may burn, will not explode. It would be delightful if we could believe him. He has had long experience in cement plants. Others in the nineties had worked even longer in the mines, yet still would not believe in the explosibility of coal dust. "In 1915," the book says, "Thomas A. Edison, in explanation of the so-called explosion that took place in his cement mill some years ago, said: 'The explosion was occasioned by fine coal dust catching fire and burning slowly in a pit, thus forming an explosive gas in the air. The explosion killed five men. Please let me emphasize the fact that it was not the dust itself that exploded.'"

A good bibliography concludes the volume. There is no question that such a book has long been needed, and this monograph will be welcomed by the profession.

New Organ of Corporate Good Fellowship

SOLVAY FOLK. A magazine published monthly for the benefit of the employees of the Solvay mining interests. 32-page pamphlet, 8 x 10½ in.; well illustrated.

A new house organ has just been added to the steadily growing number of such publications. It is published by the Solvay interests, which have mines at Kingston and Westerly in Fayette County, West Virginia; at Marytown, Big Sandy, Orkney, Warwick, Harvard and Exeter in McDowell County, West Virginia; at Spington, Mercer County, West Virginia, and at Tolland, Coaldale, Henry Clay, Big Branch, Lookout and Freeburn in Pike County, Kentucky. The editor, who keeps his name hidden for some strange reason, has done spendidly. His pages make the right appeal to the eye, though a little greater uniformity in the style of his box heads and a few minor typographical changes would better satisfy the appreciative and the reasoning faculties. The pamphlet has a children's page, a household page, a page full of jokes entitled "Bug Dust," and several pages of local gossip from the various mining centers where the Solvay-process coal is mined.

The psychology of these house organs is interesting. A man is invited to make a speech. Having accepted, his first thought is to please. "To please," the idea gets into his head as an obsession. This good feeling grows mightily as he schemes how he can please his audience. What an excellent effect will the desiring to please which a house organ creates have on the persons publishing the organ.

Secretaries of Local Coal Associations to Cooperate with Geological Survey

Local coal associations throughout the country have been unanimous in their pledge to coöperate with the United States Geological Survey in the collection of coal statistics. In designating the secretaries of local associations as representatives of the Geological Survey, the following letter sent to W. E. Blucher, of the Southwest Coal Bureau, is typical of the other letters of appointment:

In accordance with the informal discussion had between you and Mr. Lesher, Geologist in charge of Mineral Fuel Statistics, I take pleasure in designating you, as Secretary of the Southwest Coal Bureau, the representative of the Geological Survey in the matter of collecting and compiling current statistics from the coal operators of Iowa, Missouri, Kansas, Arkansas, Oklahoma and Texas relating to the progress of the coal industry in those states.

I appreciate very much the spirit of coöperation on the part of yourself and the operators in your district in entering into this coöperative arrangement, and believe that the results, both immediate and ultimate, will be to the advantage of the local industry as well as to the Geological Survey and will promote a better understanding and closer sympathy between the Department of the Interior and the producers of coal.

You are authorized by this letter to use, in your correspondence on the subject of current production and distribution statistics, the letter heads bearing the caption "U. S. Geological Survey, in coöperation with the Southwest Coal Bureau" on the general form of the sample inclosed, and to use the same captions on your envelopes and report forms. Your correspondence with the operators must necessarily carry the regular postage.

Secretaries of local coal associations, which to date have been designated representatives of the United States Geological Survey to assist in the gathering of coal statistics, are as follows: Jones Waffle, Indiana Coal Trade Bureau, Terre Haute, Ind.; C. M. Roehrig, Northeast Kentucky Coal Association, Ashland, Ky.; Charles O'Neil, Central Pennsylvania Coal Operators' Association, Altoona, Penn.; James A. Fenelon, Coal Trade Bureau of Illinois, Galesburg, Ill.; J. E. McCoy, Southern Appalachian Coal Operators' Association, Knoxville, Tenn.; O. G. Scott, Central Illinois Coal Bureau, Springfield, Ill.; W. E. Blucher, Southwest Coal Bureau, Kansas City, Mo.; F. B. Reimann, Northern Pennsylvania Coal Operators' Association, Butler, Penn.; F. J. Patton, Northern West Virginia Coal Operators' Association, Fairmont, W. Va.; D. F. Hurd, Pittsburgh Vein Operators' Association of Ohio, Cleveland; W. B. McKinney, Southern Ohio Coal Exchange, Columbus, Ohio; George Beausewine, Jr., Operators' Association of Williamson Field, Williamson, W. Va.; W. E. E. Koepler, Pocahontas Operators' Association, Bluefields, W. Va.; G. D. Kilgore, Southwestern Virginia Coal Operators' Association, Norton, Va.; E. R. Clayton, Harlan County Coal Operators' Association, Harlan, Ky.; C. J. Fletcher, Knox County Coal Operators' Association, Indianapolis; H. M. Little, Southern Indiana Coal Bureau, Evansville, Ind.; P. H. Greenlaw, Fifth and Ninth District Coal Bureau, St. Louis, Mo.; C. Ostrom, Northern Illinois Coal Operators' Association, Chicago; W. B. Innes, Western Coal Producers' Association, Billings, Montana; John G. Kerr, Colorado Coal Operators' Association, Denver; J. P. Wilson, Tug River Coal Operators' Association, Bluefields, Va.

National Coal Association in Readiness to Transmit Market Information

To carry into effect its market information service, the National Coal Association is proposing to open branch offices at Pittsburgh, Chicago and other cities. Each branch office will be the head of the tributary district. Reports are to be collected each day of the preceding day's sales. From the several reports, an analysis of the market situation will be made and telegraphed to the local association's secretaries for distribution to members. The bulletin probably will give the number of cars sold, the prices obtained, the kinds and sizes of coal and the class of customer, with a distinction between spot and contract sales.

Secretary Redfield Plans Cooperative Action Between Government and Industry

The Secretary of Commerce has proposed a plan for coöperative action between the Government and industries with the idea of stabilizing prices and meeting problems of readjustment. Secretary Redfield expects to call conferences of representatives of the various industries. He states, however, that the conferences will be first with the steel, copper, cement, lumber and other industries. The conference with the representatives of the coal industry probably will be left until the last, as fuel enters into all the industries and coal questions can be discussed best after the problems of the other industries have been discussed.

Employees of the Fuel Administration on Feb. 10 entertained Cyrus Garnsey, the assistant director of the Administration, at a smoker. During the evening, Mr. Garnsey was presented with an expensive watch.

Recommend that Tidewater Shippers Need Not Be Members of the Exchange

Recommendations have been made by the Tidewater Coal Exchange that it no longer be compulsory for shippers to tidewater to be members of the Exchange; also that operators may ship directly to consumers. It also was recommended that pre-war demurrage be restored.

The meeting of the tidewater shippers was held in the National Coal Association assembly room, but the National Coal Association was in no way a party to the conference, as has been stated in some quarters. John Callahan, of the National Coal Association, did act as chairman, but for a short time only, so as to permit of the selection of a chairman to preside over the meeting. A committee was authorized on which will be representatives of shippers to each of the tidewater ports.

Railroads to Make Prompt Settlement of Coal Freight Claims

Means will be found in the near future by the railroads to make prompt settlement of freight claims on coal. This is the most definite result of the conference held in Washington between the Railroad Relations Committee of the National Coal Association and the committee consisting of fourteen of the principal claim agents. New regulations are to be drawn up for the settlement of freight claims on coal. Another matter which brought out much discussion was the matter of who is responsible for the loss of coal when there is no prima facie evidence of loss. The meeting was described as a very satisfactory one, and it is believed that much more satisfactory handling of freight claims on coal will result.

Motion Picture Reels of Mining Industry Soon Ready for Distribution

Through the coöperation of many of the large mining and metallurgical companies throughout the country, the Bureau of Mines has been able to obtain many excellent motion picture reels showing the various phases of the mining industry. In all, the Bureau of Mines has now in its possession about 250 reels, and after these have been edited and captioned it is thought that this collection will be distributed at once.

It is the intention of the Bureau to loan these reels to mining schools and other engineering institutions throughout the United States. Effort will be made to keep this collection up to date, and to obtain reels from time to time that will show the progress that is being made in the mining industries. The supervision of collecting these reels, assembling them, and the distribution of the same, has been placed in the hands of Morton F. Leopold, safety engineer of the Bureau of Mines.

No agreement has yet been reached in regard to railroad fuel purchases, although it is believed that the Railroad Administration is convinced that publicity must be given to bids. The matter of district prices and distribution of orders within districts is still under discussion.

Revival of Interest in Peat Resources of the United States

Interest in peat has been revived to some extent by the recent act authorizing the Bureau of Mines to make an investigation of that resource. There are in the United States, according to C. C. Osborne, of the United States Geological Survey, 11,000 square miles of peat bog containing more than 12,000,000,000 tons of peat fuel. A ton of machine-made peat is equivalent, for heating purposes, to 1.3 tons of wood; one-half ton of bituminous coal and six-tenths of a ton of anthracite coal. With Europe using 20,000,000 tons of peat annually, in the production of heat and power, it is believed that no insurmountable economic difficulties stand in the way of utilizing some of the peat deposits in this country. Massachusetts and Maine are at present engaged in investigations of peat deposits in those states. With increased rail rates and the scarcity of shipping, it is believed that New England peat could be used to advantage in the areas within short distances of the deposits.

E. R. Lloyd has been appointed to succeed John D. Northrop as the geologist in charge of petroleum statistics for the Geological Survey. Mr. Northrop has resigned to enter the employ of an oil company operating in Wyoming.

Branch offices of the National Coal Association will be opened in Pittsburgh and in Chicago probably by Mar. 1. J. D. A. Morrow, the secretary of the Association, has returned to Washington after completing arrangements for these branches.

Legal Department

TAXATION OF COAL IN PLACE—Coal in place, being subject to ownership apart from the surface, either by grant of the coal by deed or reservation of it in a conveyance of the surface, thereby creating a fee simple title to the same as realty, is subject to taxation as real estate. But where the actual existence of coal under a particular tract of land is purely conjectural the interest is not subject to assessment for taxation at more than a nominal valuation. (Iowa Supreme Court, In re Colby, 169 Northwestern Reporter, 443.)

ILLINOIS WORKMEN'S COMPENSATION ACT—If a motorman in an Illinois mine was killed in the course of his employment, his surviving widow was entitled to an award under the Workmen's Compensation Act of the state, although they were living apart at the time of the accident and she was not dependent upon him for support; her rights being fixed by the fact that he was under legal obligation to support her. (Illinois Supreme Court, Smith-Lohr Coal Mining Co. vs. Industrial Commission, 121 Northeastern Reporter, 231.)

WHO MAY RECOVER FOR MINER'S DEATH—If there be a reasonable expectation of pecuniary advantage from a person bearing family relationship to another, the destruction of such expectation by negligence occasioning the death of him from whom it arose will sustain recovery of damages. Within this rule the parents of an adult miner can recover damages for negligence of his employer resulting in his death, where it appears that the decedent had sent money to them and that he intended to contribute to their support. (Gosh vs. Lehigh & Wilkes-Barre Coal Co., 68 Pennsylvania Superior Court Reports, 63.)

EDITORIALS

Plans To Reduce Illiteracy

A BILL has been introduced by Senator Hoke Smith of Georgia, appropriating $12,500,000 a year for four years for the purpose of wiping out our national illiteracy. Each state receiving its part of this appropriation will have to pass laws compelling "the instruction, for not less than 200 hours per annum, of all illiterate minors, or minors unable to speak, read or write the English language, more than 16 years of age, at schools or places or by other methods of elementary instruction, until such minors have completed a course of English generally equivalent to that supplied by third-grade schools."

Each state will also have to expend an equal amount in promoting the purpose of the Federal appropriation. The money to be appropriated by the United States is to be used solely for the compensation to teachers, superintendents and directors of education engaged in the education of such illiterates.

Every state accepting the appropriation must provide all the necessary buildings and equipment without Federal assistance. The money may not be expended for any religious or privately owned and conducted school, but apparently nothing is said about the coeducation of whites and colored people. This matter will be left to the judgment and predilections of the various states, and really it seems better to allow that degree of self-determination regarding a matter that arouses the bitterest of feeling. However, it is the wish of the public to wipe out colored as well as white illiteracy. The Federal control should be properly exercised to see that the training imparted to illiterate negroes is as competent as that provided for illiterate whites, except where a difference in language makes the teaching of the whites a work requiring greater expertness in the instructor.

The training will cover not only reading, writing and speaking English, but instruction in the "fundamental principles of government and citizenship, the elements of knowledge pertaining to self-support and homemaking, and in such other work as will assist such illiterates and foreign-born persons for successful living and intelligent American citizenship."

The weakness of the bill is that it does not require state legislation to compel adult illiterates to attend school. Our laws should compel every foreigner who steps foot on our shores to study English at a properly approved private or public school during the period of his stay here, unless he has already something more than a smattering of such instruction or receives a Governmental permit. No one can be a safe citizen of our republic unless he can understand the laws and purposes of our people.

The coal-mine operators have a keen interest in this matter. Everything that makes the personnel intelligent enables the operator to put in force plans for larger production and safer operation. A mass of unintelligent workmen is likely to be not only dangerous but also so incompetent that no progress in methods is possible. The education of the American workingman is largely responsible for his superiority as a producer to all other workingmen the world over.

After all, muscle is not the main requirement. It might have been so before James Watt and Michael Faraday revolutionized the world. Daily we are learning that taking thought is as productive as taking action. We can never put any new plan into effective operation without the support of a large number of men able to understand English and to act without having every detail explained to them at laborious length by an interpreter. If the new scheme of Senator Smith is made operative, the nation will take a stride such as has not been achieved for several decades.

In the matter of American shipping it is time we got down to bedrock on the facts in the situation. We declare it is our purpose to get American ships into all the ports of the world. This can be done only if we are willing to pay for it. The ships of other nations will carry the world's freight unless American ships afford the shipper equally low rates. It is unlikely the leaders of labor in America will sanction the repeal of the Seamen's Law, permitting our shipowners to hire whom they please, treat them as they please, and pay them what they please. The only other way is for the nation to pay a sufficient subsidy to shippers to permit them to meet foreign competition. Either the industries of America must share the burden of this subsidy, or we must abandon our shipping ambitions.

Parallels of Latitude and Meridians of Longitude

BUSINESS runs from the equator toward the poles and from the poles to the equator more readily than along parallels of latitude. Because the British and French produce what we produce, we prefer not to buy from them. Because we make what they make, they do not like to buy from us. Business along the parallels of latitude is largely distasteful to peoples engaging in it. It is competitive business. Trade reaches its largest proportions in the north temperate zone because of the populousness of that portion of the globe, and because of the relative sparseness of the population near the equator; not because the exchange of products flows naturally out of the mutual needs of those by whom the exchange is made.

It is a pleasure to do business with a planter or merchant in Nigeria or Colombia. He sends us such things as we do not have and badly want. He takes from us what the natives do not and cannot make. From the equatorial zone we get rubber and elephant's

tusks, copra and tin, spices, strange fruits, tea and coffee. No one wishes to exclude these and other tropical products. Rather we worry at times because we may not get them. On the whole, we would sooner do business with savages than with our own kind. Even the art and the trinkets of India, Central Africa and Brazil appeal by their differences; and their lands are natural places for us to sell our distinctive wares. With such people we can do all the business we please, and do it with the kindliest of feelings. When we exchange goods both parties feel they are receiving a benefit. Strange to say, the equatorial countries have little coal, or believe that they have little, though we cannot determine satisfactorily why this is so. For this reason they will accept a little coal, and the northern and southern countries are able and willing to supply them. This coal, universal as it is, might readily go to the equatorial regions were there much demand; but unfortunately for us, the equator needs no domestic heating and has few manufactories.

The population of the equatorial region is small, the people are in large part Indians and negroes, and therefore uneducated; the people, of whatever color, are not as hustling as we are, owing to the excessive heat of the sun. If it were not for this all industry would travel along meridians rather than along parallels of latitude, and trade would be complementary rather than competitive. We would fill the equatorial needs and the equator would fill ours.

At a basket picnic every woman brings her contribution of good, fresh and wholesome food. She has pride in its quality and quantity. We all are bringing our baskets to the common table. Some bring as little as they can and that little is bad and useless. If we all strive to bring less than another, how shall we all fare better? Let us strive so earnestly that when we open our baskets at the public fiesta they will not be an unworthy contribution to the public necessities. Otherwise ours truly will be a miser's mess.

When Industry Stumbles

ON THE whole the mining industry is reasonably free of strikes, but there is an undercurrent of discontent which may, at any time, make trouble. The coal industry is face to face with a spirit which finds a reason for wage increases in every development.

During the war the need for coal was acute. The mine worker saw in this fact an opportunity to urge the importance of high wages. "If they are not granted," he cried, "the industry will be deserted for other war industries. The operator must pay larger wages, if not for our sake at least for his own." Now the war is over and business is slack there arises another plea. "With short time we cannot make a living. Wages must be raised so that a man may work short time and keep up his living standard."

In former days it used to be said that wages must be lowered so as to encourage business. We have changed all that. Now, when demand falls, we raise the wages of the workers. When the camel of industry stumbles he comes down low enough that we can chuck on another case. Thus the more it stumbles the more load it has to bear.

Buy, Buy, Buy

SAVING is not altogether a negative virtue. It is not all scrimping self denial. Savings are the difference between income and outgo. We can save by raising income; we can save by decreasing outgo. The first is the better means. The miserly person who knows nothing but how to do without usually dies possessed of little else but greed and cunning.

So too with the nation. It is time to spend wisely on what we need, to make such purchases as will promote economical industry. The country has to meet the Fifth Liberty Loan of about $5,000,000,000. It will meet it more readily if every one is busy in the coal mines and in the factories. If we hold off to buy till the better time we shall find it will not come.

Wages are not going to be lowered even though the new scale paid to the copper men would seem to indicate that they are. The unions will keep up their high scales and the non-union men have many of them had no increases and therefore stand to receive an advance in wage rather than a decrease. Moreover there is a further good reason for holding up wages. It seems passing strange that the reason did not seem valid to the copper industry; it is a logical reason nevertheless and should be set down.

Wherever large stocks are on hand there is need to keep wages up. Otherwise it will become necessary to sell the whole product produced by high wages at a price approximating the rate at which it can be produced by low wages. The buyer will wait till the price falls to a figure based on the low wage. Thus the producer loses heavily for he has to dispose of his large accumulations of product at a figure much below the price at which he produced it.

Had he maintained wages he could have sold it at a fair margin above the cost of production. So long as wages were maintained no one would sell far below production cost but with wages cut it would be quite the best policy for the individual, who happened not to have a stock of mineral, to run his mines and sell the product at the best margin he could obtain. By reducing the wages of the miners the copper men reduced the possibility that they would be able to "break even" on the copper produced under a high wage scale.

Many will not agree with the copper men. To them a reduction in wage seemed natural, the scale being one which was arranged to slide up and down with the price of copper. True the War Industries Board thrust the price of copper down during the continuance of hostilities and the Labor Board jammed the compensating lever that made wages follow prices. But the lever has been repaired and the principle of the sliding scale has been reëstablished, unfortunate as it is. It serves the best interests of neither capital, labor, nor industry. And it will not be followed we may be sure in other lines of business.

Only a short stretch separates us from big business and a labor shortage. Immigration has been stopped for years and we have lost many men to the war. Of these, many will never come back, and there will be a hue and cry for more men.

Why delay purchasing now when a little courage for a week or two will fully justify our faith? A little buying will turn the tide and bring a flood of prosperity.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

In the anthracite region it seems likely that there will be many button strikes to coerce new arrivals from the cities to join the union, whether they will or not. The mine workers are complaining about the closing of inefficient mines. They would have the operators of the southern fields keep these plants running at a loss. As the operators are losing money on their entire investment in the southern field at present prices, the principle "All or none" pressed to its consequences will probably be answered by the operators with the single word "None." The only way to save the efficient mines is by shutting down the inefficient; that is, providing the selling price of coal is not raised.

The New River and Winding Gulf mine workers are proposing to present unreasonable wage claims. These show a desire on the part of the miner to profiteer at the expense of workmen in other industries, who will have to buy his coal and pay him his wages. The miner has many employers—absentee-employers many of them, men whom he has never seen. Some of them live in slums and some in villages. The big corporations that use his coal make goods for these people. Coal that is used for steam raising is used, not so much for the corporation which buys the coal, as for the person who uses the product of the factory. From these persons, largely not better supplied than the miner, the increases in coal price must inevitably come. A desire for excessive wages is not a sign of superiority of character, but rather evidence that the individual seeking the big pay wants something more than his appropriate share of the world's product.

Want Steady Work or Suspension

The United Mine Workers of America in the three anthracite districts will hold an important meeting at an early date. Two problems face the coal miners of this and other fields; one is the sudden halt of the coal industry, and the other is the importation of labor from the cities into the coal fields.

The Pennsylvania Coal Co. and the interests associated with that corporation recruited men in the larger cities through advertisements in the newspapers and by means of labor scouts. These men are in most cases new to the mining game. The need for their importation has apparently ended with the changed labor conditions, and now that they are here the union proposes to have them join its ranks or quit their places.

The other matter that the miners hope to consider is a plan to shut all the mines of Pennsylvania and adjoining states for a period of two weeks, to resume later for a steady run, until the market is replenished, when another suspension would be in order. The larger operators in the anthracite field in times of poor market are in the habit of closing the less profitable mines and operating those which pay best. This is notably true in the Schuylkill region. In that field the Lehigh Valley Coal Co. often suspends its Blackwood colliery for the summer season.

The Philadelphia & Reading Coal and Iron Co. follows the same plan in its Tremont-Tower City district. Labor conditions in that vicinity are peculiar to that district. They make a suspension quite feasible without loss to the company. The men are for the most part owners of small farms and are not entirely dependent on the mines for their livelihood. In winter labor is plentiful at these collieries, by reason of the cessation of farm work.

West Virginia Will Seek Higher Wages

It is learned from a reliable source that when representatives of District No. 29 of Central West Virginia met at Beckley in the latter part of January to draw up a new wage scale they formulated plans for obtaining material advances in wages.

It is said that the terms of the new scale, as drafted by the committee of District 29, call for an increase in the wages of day men of from $1 to $1.50 a day. The increase fixed for monthly men is said to run from $25 to $75 a month above the present rate. It is also understood that a minimum wage of $200 a month has been asked for what are known as company men. The demands also stipulate that there shall be an increase of 12c. a ton in the mining rate and that all overtime shall be paid for at the rate of time and a half.

The plan of the miners expressly provides that unless some agreement for a closed shop is reached, and the union is allowed to collect by check-off all dues, assessments and initiation fees through company offices, whatever these imposts may be, no contract shall be signed. The miners in the proposed agreement have incorporated a provision that all the miners of the district included in the agreement are to be paid by weight for coal mined and on the basis of a short ton. Still another point upon which the miners lay stress is that the loading of mine cars with coal shall not be limited in any way.

As having some bearing on the question of what may be finally consummated in the way of an agreement between miners and operators of District 29, the following statement of Secretary T. L. Lewis of the New River Association may be considered significant:

"It is well known that the contract between the United Mine Workers and the operators of the New River and Winding Gulf fields ends on Apr. 1. The present agreement provides that a conference be held 60 days before Apr. 1.

"The operators of both fields have always lived up to any promises made and will no doubt arrange to comply with the provisions of the agreement in the New River and Winding Gulf Districts.

"Since the wage agreements in the New River and Winding Gulf fields have passed under the jurisdiction of the United States Fuel Administration, which has made it very clear that there will be no change in the terms of the wage agreement until the official announcement has been made that the terms of the peace treaty have been signed, there is nothing to do but comply with the wishes of the Federal Government as expressed through the United States Fuel Administration.

"The coal market had during the past month or two become demoralized. The price of coal has been declining. No one can at this time foretell what the future holds in store for the coal business, but we are anxious to continue in force the present high standard of wages in our field, and we desire to say to all those interested that we shall do all we can legitimately to maintain or secure such a price for our coal as will permit of our continuing to pay such wages."

A meeting held Feb. 1 at Charleston at which the labor representatives met with the New River and Winding Gulf operators lasted only long enough for the operators to declare their position, the character of which is well covered by T. L. Lewis, the secretary, in the statement just quoted. The public is strongly against any further increases in the mine worker's wage, hence the operators of the New River and Winding Gulf regions can be assured of national support in resisting this new imposition on industry.

Be Proud of the Town You Live In

Of all ways the best way to have a tidy town is to be careful not to litter the town you have. A man from Sciacca the other day was saying how clean the City of Palermo was. There was a rubbish picker on every block who kept the streets like a clean pin. Just as he was bragging about the chief city of his island, his eye fell on a paper box and he opened the door and threw the box into the street, to be an eyesore to everybody. If the people of Palermo are all like that man they will need a rubbish picker for every hundred houses. The way to be clean is to keep clean. On windless days burn your rubbish in the backyard and keep it off the streets.

Be Tidyman of Tidytown.

DISCUSSION BY READERS

A.-C. vs. D.-C. Current in Mines

Letter No. 1—In reading the report of the Coal Mining Institute of America, regarding the meeting of that institute at Pittsburgh, Dec. 4, which appeared in *Coal Age*, Dec. 12, p. 1081, I notice that among the several vital problems relating to coal mining, discussed at that meeting, was the question, "Is the underground use of the alternating current more hazardous than the use of the direct current?"

Allow me to say that the question of the use of either of these forms of electricity, in mines, is not one that concerns their relative hazard, but regards, rather, the efficiency and purpose of the installation. It is a question whether the supplanting of one of these forms of current by the other, in any particular instance, will prove equally efficient in operation, although the hazard, in mines, by reason of men and animals coming in contact with live wires, may be lessened.

Perhaps, this discussion may have thrown some light on the practicability of adopting one or another form of current; but, in my experience, we have never used alternating current in our mines for hauling coal with any success. Also, mining practice has proved that direct current is not as well adapted for transmission as alternating current. Each of these forms of current should, therefore, be employed for the purpose for which it is best adapted, and the conductors so arranged as to invite the least hazard.

Danger of Contact with High-Voltage Wires

The voltage being equal, in each case, it is my belief there is more danger in coming in contact with a bare or poorly insulated wire transmitting alternating current, than one carrying direct current. Coming in contact with a single wire of a three-phase alternating-current system will not blow a short. I have even observed instances where contact with two wires of that system also fails to blow a short. It would, indeed, be a rare case where one would accidentally come in contact with all three wires, especially if these are properly insulated. Contact with a high voltage live wire is liable to prove fatal, unless a short is blown or someone is at hand to render assistance.

There are a number of mines that employ alternating current for the purposes of pumping and ventilation. In most cases, it has not been found necessary to carry the wires underground any great distance. Boreholes have been sunk at points on the surface directly over the points in the mine where the motor to be operated by the current is located. By this arrangement, there is little danger of anyone coming in contact with live wires and no risk is assumed by reason of employing an alternating current. The only person in any danger is the one in charge of the machinery to be operated. Anyone else would deliberately go out of his way to encounter such danger.

There are probably some mines where motors requiring to be operated by alternating current cannot be reached by boreholes from the surface. In such cases, the dangers and hazards incident to carrying the current into the mine may be minimized by employing heavily insulated conductors. Such conductors should, moreover, be kept off main haulways and travelingways, and men should be forbidden to travel where such wires are hung or to enter places where these motors are installed.

ELECTRICIAN.

Thomas, W. Va.

Utilizing Mine Gas To Save Fuel

Letter No. 1—While I know nothing regarding the authenticity of the rumor, it is reported that one of the large operating companies in this district proposes to experiment on the question of utilizing the gas generated in its mines, by mixing the return air, charged with inflammable gas, with the air entering the fireboxes in the power plant and, possibly, adding thereto a certain percentage of elementary gas to increase the efficacy of the plant.

This report recalls the discussion that took place about a year ago, which was started by attention being drawn, in the public press, to the large loss of power resulting from the escape into the atmosphere of the great volumes of gas generated in mine workings. The idea of conserving this gas and utilizing it for the production of power was emphasized and given greater publicity through the efforts of Governor Brumbaugh, who summoned a number of engineers and coal men to a conference on the subject.

Economy Must Not Be Sought at the Sacrifice of Safety

The possibilities and dangers of the plan were freely discussed in the columns of *Coal Age* [Vol 12, p. 1029] at that time. To my mind, there is no doubt as to the economy of burning the gas that is contained in the return air of the mines and which is now wasted into the atmosphere. But, suppose the figures do show that, say a 10 per cent. saving of fuel can be effected by this means, what about the safety of injecting this gas-charged air into the firebox of a furnace?

It is a well-known fact that when pure methane is mixed with air the mixture becomes explosive, or reaches the lower explosive limit, when the proportion of gas to air is 1: 13, or the mixture contains 7.14 per cent. of gas. If dust or olefiant gas is present, the mixture is explosive when an even smaller percentage of gas is present in the air. The violence of the explosion increases with the percentage of gas present and reaches a maximum at 9.46 per cent.

How to save this great waste of gas is a difficult problem. It is one thing to suggest the possibility, but quite another thing to accomplish the fact. The piping

of methane from a strong permanent blower in a mine has been accomplished many times and the gas utilized to advantage in the development of power, but such an arrangement had no connection with the return air current, which made it safe for use. Where mining operations can be kept far enough from the source of supply of such a blower, the plan may often prove to be a paying proposition, as the pressure of the blower is not apt to be diminished by the mining of the coal.

The calculations on which the feasibility of the proposed plan to which I have referred is based are interesting. They are about as follows: Assume a forced draft of, say 1000 cu.ft. of pure air per minute is supplied to the furnaces, and compare the results with those obtained when an equal volume of return air is drawn from the Loomis Colliery, at Wilkes-Barre, Penn. A report from this colliery shows an average analysis of this return air to be: Oxygen, 20 per cent.; nitrogen, 78.93 per cent.; methane, 1 per cent.; carbon dioxide, 0.07 per cent.

Heat Generated by Combustion of Coal When Consuming 1000 Cu.Ft. of Pure Air

Let us, now, assume such a temperature and pressure that the pure air weighs 0.0765 lb. per cu.ft., which makes the weight of 1000 cu.ft. of this air, which is the assumed volume, $1000 \times 0.0765 = 76.5$ lb. Oxygen forms 23 per cent. by weight of pure air, and the weight of oxygen in this volume is therefore $76.5 \times 0.23 = 17.595$ pounds.

Again, the complete combustion of 1 lb. of carbon requires $2\frac{2}{3}$ lb. of oxygen; hence, the weight of carbon burned by the oxygen in 1000 cu.ft. of pure air is $17.595 \div 2\frac{2}{3} = 6.598$ lb. But, the heat developed by a pound of carbon burning to carbon dioxide being 14,544 B.t.u., the heat generated by the assumed supply of 1000 cu.ft. of pure air to the furnaces is $14{,}544 \times 6.598 = 95.961$ B.t.u.

Heat Generated When 1000 Cu.Ft. of Gas-Charged Air is Consumed in the Furnace

Now, considering 1000 cu.ft. of the return air, taken from the Loomis Colliery and containing 20 per cent. of oxygen and 1 per cent. of methane, the volume of oxygen entering the furnace is $1000 \times 0.20 = 200$ cu.ft., and that of methane $1000 \times 0.01 = 10$ cu.ft. But the specific gravity of oxygen being 1.1056 and that of methane 0.559, the weight of oxygen in 1000 cu.ft. of this return air is $200\ (1.1056 \times 0.0765) = 16.916$ lb. Likewise, the weight of methane, in the same volume of return air, is $10(0.0559 \times 0.0765) = 0.428$ pound.

But, 1 lb. of methane, in burning to carbon dioxide and water, consumes four times its weight of oxygen, which makes the weight of oxygen taken up by the methane, in this case, $4 \times 0.428 = 1.712$ lb. Therefore, this weight of oxygen must be deducted from that just found, in order to obtain the net weight of oxygen available for the consumption of the carbon in the coal, which gives $16.916 - 1.712 = 15.204$ pounds.

As before, the weight of carbon consumed by this weight of oxygen is, then, $15.204 \div 2\frac{2}{3} = 5.7015$ lb.; and the heat generated by this combustion is $5.7015 \times 14{,}544 = 82{,}923$ B.t.u. To this must be added, in this case, the heat generated by the methane burning to carbon dioxide and water, which is 23,513 B.t.u. per lb. of the gas, or a total of $0.428 \times 23{,}513 = 10{,}064$ B.t.u. The total heat generated is, therefore, $82{,}923 + 10{,}064 = 92{,}987$ B.t.u.

Were we to stop here, the comparison would show a loss in the total heat generated. However, it is observed that a less weight of carbon (coal) is consumed when using the gas-charged air of the return current. Hence, to complete this comparison it is necessary to estimate the heat generated, *per pound of carbon consumed in each case*, which gives the following:

Pure air, $95{,}961 \div 6.598 = 14{,}544$ B.t.u.
Return air, $92{,}987 \div 5.7015 = 16{,}309$ B.t.u.

The saving is, therefore, $16{,}309 - 14.544 = 1765$ B.t.u.; or, $(1765 \times 100) \div 16{,}309 = 10.8$ per cent.

Ferndale Explosion Caused by Gas Blower

In closing, allow me to cite an explosion that occurred when I was employed in the Ferndale colliery of South Wales, Nov. 8, 1867. The explosion was caused by the sudden breaking out of a blower that yielded a large volume of gas, which reached the furnace by which the mine was ventilated. The result was a terrible loss of life [178 lives, *Coal Age*, Vol. 9, p. 1025] and destruction of property.

The small margin between the percentage of air in the return current of a mine generating gas and the lower explosive limit of the gas appalls one with the thought of the danger of piping the return air of a mine generating gas, to the furnaces of a power plant. Any increase in the gaseous condition of the mine would undoubtedly result in a disastrous explosion that would wreck the power plant, and nothing would prevent its being carried back into the mine.

Pittston, Penn. William D. Owens.

Perils in Reconstruction

Letter No. 4—I want to voice my approval of the suggestion contained in the Foreword that appeared some time ago in *Coal Age* [Nov. 21, 1918], regarding the patriotic duties of buyers. The Foreword laid emphasis on the fact that we should not postpone purchases that are necessary, in the hope that prices would be lower in the near future. Prices will assuredly recede from the present high level, but progress in this direction will naturally be slow.

Our clearest thinkers have proven beyond a doubt that the drop in prices will be much more gradual than the rise. This opinion is based upon accurate knowledge of the situation existing in this and other countries wherever the products of American labor are transported. Truly, it behooves mine owners and managers of large industries to keep their houses in order.

Peace Problems Find Us Unprepared

We have found ourselves as unprepared for peace as we were unprepared for war, which is no discredit, but is the natural result of the sudden downfall of the enemy, following closely the vast preparation made by America to insure victory. Now, it has become necessary to throw in the reverse gears and start the work of demobilization and reconstruction in every branch of our industrial life.

While it may not be possible for every soldier to be returned to his old job, the business organization of this country is so founded that our industries will

rapidly slip back to a normal basis of production, and there will be work for all. There will, undoubtedly, be some complaining from pessimists; but real builders will give little heed to these skeptical mutterings. It is these real leaders of business—men who have devoted their lifetime to productive work on a large scale and who are clear thinkers—who achieve success in reconstruction and we must follow their lead.

Optimism of Leaders of the Coal and Steel Industries and Merchants

Speaking of the work of leaders of great industries, one can but admire such men as John Wanamaker, the merchant; Elbert Gary, the head of the steel interests; and John D. Rockefeller, Jr., representing the coal and iron industries of the West. These men stand for the highest ideals of industrial reconstruction. Without exception they have expressed themselves as being convinced that the best years of the United States lie ahead of them, and that the next five or six years will be years of unprecedented prosperity in American commerce and industry.

To be convinced of the truth of this optimism, one has but to consider the demands that will be made upon this country by reason of the devastation abroad, where rebuilding will require an enormous consumption of all materials, such as steel, cement, plaster, lumber, brick, and numerous other supplies. England and Russia will make heavy drafts on this country for years to come, which will mean a vast stimulus to our export trade and require the building and equipment, by us, of the largest merchant marine of the world.

Coal Forms the Basis of and Is Needful to All Industrial Progress

In face of these facts, it is inconceivable that industry should slacken for more than a brief period of time, which will be required for readjustment, and then every branch of manufacture and trade will regain a normal footing. Production has always been governed by the law of supply and demand—supply of coal and raw material and a market demand for the products of labor. Surely, a greater demand than the present has never existed.

Practically all production is based on coal supply. Raw materials can be worked only by the use of power, which means the consumption of enormous quantities of coal, which is the king of our natural resources. Again, the operation of mines means a large production of mine supplies, mine locomotives, cars, rails, and other requirements. While it is true these have been selling at prices prodigiously high, as have all other commodities, the present is no time to hold back on purchases of equipment and supplies that are needed for operating the mines to their fullest capacity.

There is no need, at the present time, for paying heed to the cry that "overproduction will ruin the coal business." It is my earnest conviction that there will be no overproduction of coal, in this country, for some time to come. Let us see that our plants are kept in the best possible condition that no one will be able to say the lack of coal has hindered the march of progress, which promises to give every miner steady employment for several years to come.

Philadelphia, Penn. OPTIMIST.

Certification and Safety

Letter No. 1—In the report of the recent annual meeting of the Coal Mining Institute of America, appearing in *Coal Age*, Dec. 12, p. 1080, the fourth question discussed interested me most. It reads as follows: "Has the law permitting the employment of noncertified officials, in coal mines, been detrimental to their (the mines) efficient and safe operation?"

As might be expected, the discussion developed a strong difference of opinion among those present. The report states that while some claimed that the amended law has produced no effect, in the anthracite field, other than to cause the employment of uncertified men to fill positions formerly open only to men holding certificates, others who took part in the discussion claimed quite the contrary. In one case, a speaker stated that 28 men, holding no certificates, were employed in one inspection district that showed an increase of accidents largely due to that cause.

What appeals to me, in this connection, is that an intelligent body of men, meeting to discuss questions of vital interest to their calling, should not arrive at some definite conclusion. In this instance, as far as gaining any accurate knowledge of the situation and adopting some form of remedial resolution, the question might just as well never have been brought to the notice of the meeting. To my mind, a great boon to the mining industry would result had the discussion of members been confined to fewer subjects and each subject been dealt with more fully, whereby practical conclusions could have been reached. That is what mining men desire.

While I admit, as was remarked at the meeting, that "a certificate is not a guarantee of competency," I claim that a man without a certificate cannot be classed as competent, in respect to present-day requirements when so much depends on the technical knowledge of men holding responsible positions in coal mining.

Different Estimates of Competent Foremen

A man of practical mining experience, who possesses, besides, sufficient technical knowledge to enable him to pass an examination before the state mining board, is far more competent than one who has the same practical experience but possesses no technical knowledge. On the other hand, a man who has all the book knowledge it is possible for him to get, but possesses little practical experience in mining, is unfitted to fill any responsible position in the operation of a mine, and particularly the work underground.

Coal operators are apt to consider that the man who can get out the most coal at the least expense is the most competent man, whether or not he holds a certificate. Let me ask such operators if they are sure such a standard of competency will guarantee the future welfare of their properties. Do they realize that their mines are being worked in a haphazard manner, instead of being operated according to a scientific principle? In the former case, the responsible party sooner or later sees "the writing on the wall" and gives up his job before the results of his incompetency become too plainly evident to his employers.

The difficulties that are sure to follow and reveal a ruined mine are left for his successor to handle and

solve as he may. Many a good man, succeeding to a position in a mine that has been mismanaged, realizes as no one else does that the man before him gained his reputation for competency, at the cost of the mine.

A hard uphill struggle with high costs faces the newcomer, and it is not strange that this one is too frequently regarded by his employer as being less competent than the man before him. It does not occur to the management that the man they had formerly trusted has wrecked the mine and made it impossible for the new man to produce results. True it is, as one speaker stated, that "operators are not always competent to judge the qualifications of the foremen."

As well may it be argued that there is no need for the certification, by examination, of our state mine inspectors, as to disclaim the need of the same for men seeking the position of mine foreman. Both of these officials have the same problems to handle with respect to the safety of the mine and the men employed therein, and each has the same need of both practical and technical experience and knowledge if we are to avoid dangers of mining, secure the economical extraction of the coal and conserve our natural resources.

Brief Review of Coal-Mining Legislation

Allow me, in closing, to refer to the report of the Avondale (Penn.) disaster of Sept. 6, 1869, when an anthracite breaker, located over the mouth of a shaft, where there was but one opening, caught fire and was burned, with the result that 108 men at work in the mine were asphyxiated.

As is well known, this terrible disaster caused the Pennsylvania legislature to pass the first general law ever enacted in the United States, providing for the regulation and inspection of anthracite mines, Mar. 3, 1870. A similar law was enacted for bituminous mines, in Pennsylvania, in 1877; and, in 1885, the law was passed requiring the certification of mine foremen and assistant foremen.

In my opinion, if it was necessary, in 1885, to employ certified foremen in mines, in order to reduce the number of accidents therein, it surely must be expedient to require the same method of certification of these officials, at the present time, not only in Pennsylvania, but in every coal-producing state.

This is made more imperative by the use of electricity and compressed air for driving much complicated machinery and equipment, requiring mechanical skill and technical knowledge for its operation. I hope to see this subject thoroughly discussed in *Coal Age*, whose readers are able to weigh intelligently the pros and cons and decide the necessity or otherwise of certified mine foremen.

James Touhey.

Vancouver, B. C., Canada.

Hindrances to Coal Production

Letter No. 9—In the recent discussion of the many hindrances to the production of coal, mention has been made of almost every conceivable thing, as intemperance, poor or inadequate equipment, undesirable living or social conditions, etc.

It is readily granted that all of these play their part in contributing, more or less, to the minimizing of coal production. I read with interest the suggestions made for eliminating these different causes and believe that, with the right management of a mine, many of them can be counteracted.

If my memory serves me correctly, however, mention has not been made of one important hindrance to mine work. I refer to the celebration, by foreign miners, of their many holidays. To my knowledge, there has never been any stirring impulse among this class of miners to overcome this hindrance to the work. Even the war has not provided the patriotic stimulus required to induce the foreign miner to refrain from these celebrations and continue his work in the mine. It is difficult to estimate the loss in tonnage due to this cause alone during the war, and it is probable that the same will still continue to reduce the output of our mines and hamper the industry.

Plan to Compensate for Foreigners' Holidays

One plan that I have seen tried in overcoming this difficulty and avoiding a part of the loss in production is to operate the mine till midnight, preceding a foreign holiday. Where it is practicable to dump coal after nightfall, this suggestion will generally be found valuable. During the war, some of the mines adopted this plan and found that the majority of the men were willing to work through till midnight, preceding a holiday. It gave them an opportunity of making a fair day's wages, without violating the spirit of the particular feast or holiday, which they were all anxious to observe after their own method and custom.

In my own experience, I have found little or no difficulty in getting the large majority of our men to work a double shift in view of the holiday, which would give them an opportunity to rest. In my canvass of the mine, I have found that, unless this plan was adopted, nearly all of my men would be absent the following day.

Thomas, W. Va. Foreman.

[This letter will close the discussion on "Hindrances to Coal Production."—Editor.]

Perplexities of Mine Foremen

Letter No. 11—The letters relating to the problems confronting a mine foreman—the man who comes directly in touch with each individual employed in the mine—have interested me greatly and I want to draw attention to one point that, in my opinion, is one of the most difficult situations a foreman is ever compelled to face.

There is a certain class of miners who may be properly described by the term "suckers." These fellows, instead of taking their complaints directly to the foreman, have a habit of going over the foreman's head and telling their grievances to the superintendent. I am sorry to say that one will frequently find a superintendent who is silly enough to listen to such miners, instead of telling them to see their foreman. The miner who will do this trick is usually a chronic kicker, and goes to the superintendent, whom he believes is not acquainted with his ways and will give his little matters more attention than he could hope to receive from the foreman, who knows him better.

A superintendent who is wise will promptly refer all such complaints to the foreman, who is in direct charge of the men. Failure to do this not only displays a

disposition on the part of the superintendent to distrust his foreman, but is also liable to arouse feeling among the employees, who are led to think that the foreman is not the one that will give them the most satisfaction. In other words, the foreman loses prestige with the men and his influence over them is lessened.

Every good foreman must be capable of divining correctly the disposition of each individual he employs and dealing with them as individuals. Some men are much easier to handle than others. While some are interested in the welfare of the company, others seek every opportunity to enrich themselves at their employer's expense. Some men are neat and accurate in their work, while others are dilatory and wasteful, desiring to get the most pay for as little work as possible.

Foremen Require Tact in Treatment of Men

A foreman must be able to treat these different dispositions of his men with tact. He must be firm in respect to seeing that his orders are strictly obeyed. He must avoid letting his men feel that he is socially above them, and show that he is interested in their welfare. His instructions must always be along practical lines.

While it is natural for a foreman to think more of a man who shows an interest in his work, he must manifest no favoritism and have no "pets." He must listen to all complaints that are seriously made and not be hasty in pronouncing judgment before he has thoroughly investigated all claims. It is a foreman's duty to adjust a matter in the most economical way, conferring with his superintendent whenever this may be necessary, as it will show the disposition of the foreman to do what is right, and will impress both the superintendent and the miner whose claim he is trying to adjust. Such action will go far toward preventing miners from taking their grievances to the superintendent, as it will increase the confidence of the men in the ability and fairness of the boss. I. T. C.

Oliver Springs, Tenn.

Letter No. 12—It is my belief that a good mine foreman will meet with a great many perplexing problems. I fail to see how he can escape them, because they are present in all coal mines. An indifferent foreman may not meet with the same difficulties as one who is more painstaking and careful, because he does not attempt to improve conditions but allows many matters to take their own course.

Now that the war is over, the suggestion of applying martial law to enforce miners to work the full 8-hour shift, which was made by R. W. Lightburn, *Coal Age*, Dec. 5, p. 1047, does not call for consideration. Certainly, it is aggravating when a loader cannot get the cars he needs to load his coal, or having the cars finds that his coal is not cut because a driver or a machinerunner is satisfied with 4 or 5 hours' work instead of remaining at his post throughout the shift.

It appears to me that there should be an effective remedy to apply in such cases. If such independence of workers results from their knowledge of a scarcity of men to fill their places, attention should be given at once, by mine officials, to the training of more men for that work. Men often become dissatisfied with their particular work, for little or no reason.

A machinerunner may regard his work as more hazardous than that of the loader, or think that because of the dust he is entitled to work shorter time, or there may be a consciousness of his own skill and importance that gives him an overbearing and selfish disposition and leads him to disregard the interests of others and consider solely his own convenience.

Speaking of complaints, if a mine foreman took these as seriously as they are usually made to appear he would be run to death in short order. The fact that a foreman turning a deaf ear to the complaint of a miner regarding the condition of his place causes the miner to light his pipe and start for home is no proof that the foreman made a mistake in not going at once to look at the place and satisfy the miner.

Nine times out of ten the foreman knows that the miner himself is to blame and, further, that he is only seeking an excuse to get out of the mine, and there is no great loss in his going. To my mind, there is no cause for a foreman to get excited in such a case. Let him jolly the man along, remembering that more will be accomplished by tact and method than by an angry word that can only arouse hatred.

Daily Visits to Working Places Required

In West Virginia, the law requires a mine foreman or his assistant to visit every working place, at least once a day, while the miner is at work. When this is done the knowledge of the foreman as to the condition of a miner's place is equal to that of the miner himself, unless there has suddenly developed a bad slip in the roof, a fall of slate, a gas feeder, or other unexpected trouble. In any case, the foreman can remain cool and advise the miner to work in another place until he gets around. He knows that there are other matters of equal importance, which are urgent, and all must take their proper turn.

A foreman should make it a rule to anticipate most of these complaints and, if possible, prevent many of them from being made, by seeing that every working place is safe for work and has a plentiful supply of timber and tracking. Where water is liable to accumulate, attention should be given to draining the place and making it fit for work.

Good Foremen Keep Men from Going Home

A good foreman will not let any man go home when it is a possible thing to adjust his difficulty and keep him at work. It will sometimes happen that roadmen have not laid the switch necessary to enable a car to be taken into a place; or a fall may have occurred in that section, which prevents them from getting the needed cars. But, while these matters are being adjusted, there is generally something that a mine foreman can give men to employ them profitably, until they can return to their place.

In general, let me say it is not creditable to a foreman's ability to allow good men to go home because of some little delay in getting their place in readiness for them to work. If men go home, with an able foreman in charge, it is because of their unwillingness to work and their desire to get out of the mine.

Thomas, W. Va. W. H. Noone.

[This letter will close the discussion of "Perplexities of Mine Foremen."—Editor.]

INQUIRIES OF GENERAL INTEREST

Piping Mine Gas to the Surface

Kindly answer the following question: In a mine generating large quantities of gas, a fire started in No. 4 room on the second south entry, at a distance of 1000 ft. from the main shaft. The fire gained such headway that it was thought advisable to seal the mine, which was done.

When this had been done, a 3-in. hole was drilled from the surface into the room where the fire was located, the purpose being to drain off the gas, which was at its most explosive point. I want to ask if this gas was lighted at the top of the pipe would it explode the mine? Is there any record of such an occurrence?

Francisco, Ind. HARMON KELLEY.

Assuming that the gas-charged air issuing from the pipe is a firedamp mixture of explosive proportions, as stated, its ignition at the top of the pipe would be promptly followed by an explosion of the same mixture accumulated in the mine. A feeder of pure gas piped to the surface would burn quietly without explosion, as is the case in numerous instances where it is desired to drain the gas from the measures. We know of no recorded instance of a mine being exploded from this cause.

Lubricating Mine Cars

Kindly permit me to ask for an expression of opinion from mining men as to the cost of lubricating mine cars equipped with the average type of plain-bearing wheels. Can anyone answer this question by giving definite facts and figures? While some advocate the use of "blackstrap" once a day, or every time the car comes to the tipple, others claim it is necessary to oil the cars, say four times a week, and still others say that once a week is sufficient.

It is stated by some that a half-pint of oil should be squirted into a wheel of the self-oiling type of plain bearing, at one time. In many cases, a quart more or less, of oil is poured into or squirted at or on the wheel every time it is oiled. As an illustration of this, the incident recorded by a writer who observed the oiling of car wheels at an Alabama mine, *Coal Age*, Jan. 30, p. 246, is of interest.

From the best obtainable information, the average mine practice, regarding the oiling of plain-bearing car wheels, is to apply the oil every time a car comes to the tipple or to the shaft bottom, when about a half-pint of black oil is used on each wheel. Now, if that is the case, the waste of lubricating oil on such cars must amount to an enormous figure, in the course of a year.

Suppose, for example, that the average turn of cars, in mines, is about two and one-half times a day. Where this is the case, each car, perhaps, consumes about five pints of oil per day; and, counting 280 working days per year, this would amount to 175 gal. a year. The cost of black oil ranges from 12 to 15c. per gal. Estimating at the lower figure, the cost for lubricating a single car equipped with plain bearings would be $175 \times 0.12 = \$21$. Even allowing that this estimated amount is twice too large, the cost of lubricating would be $10.50 per car per year, which is no inconsiderable item on the mine cost-sheet.

Only recently, I saw it stated that cars equipped with roller bearings required to be lubricated but once in from three to six months, when only one pound of grease or less is applied to each wheel. Assuming, for sake of comparison, that these cars are lubricated every three months, 16 pounds of grease would be required, per car, per year, at a cost of 10c. per pound, making the total cost for lubricant, $1.60, per car, per year. This shows a difference in the cost of lubricant for plain-bearing, as compared with roller-bearing cars, taking the lowest estimate in each case, $10.50 — $1.60 = $8.90, per car, per year. Where a mine has 500 cars in daily use, this would represent a saving of $4450 per year.

In this comparison, the larger estimate appears to be too great, while the smaller one would seem too small in considering that 75 per cent. of the black oil applied to plain bearing cars, in the ordinary mine, leaks out or, perhaps, never reaches the bearing at all, but is wasted in its application.

The estimated costs just given is for lubricant only and does not include the labor required for its application. When plain-bearing cars are used the oiler must be constantly on hand, and the cost of labor for lubricating, say 500 cars, would amount to about $8 per day, or $2240 per year.

On the other hand, when mine cars are equipped with roller bearings their lubrication will require the labor of one man 40 days a year, at $4 per day, or a total of $160 per year, showing a saving in favor of the latter type of cars of $2080 per year. If this estimate is taken as being approximately correct the entire saving for lubrication, in the use of roller-bearing cars, is $6530 per year, in a mine where 500 such cars are in use.

As this sum represents a liberal rate of interest on a considerable amount of money, it would be of interest to hear from any who have kept an accurate account of these costs, in the lubrication of either plain-bearing or roller-bearing cars. OBSERVER.

Philadelphia, Penn.

It is to be hoped that this inquiry, regarding the cost of lubricating plain-bearing and roller-bearing cars, and the request for figures representing actual costs in practice, will be responded to by the readers of *Coal Age*, who are invited to give the results of their observations and experience. The subject is worthy of careful consideration, as is clearly shown in the estimated costs given in the inquiry.

EXAMINATION QUESTIONS

Mine Managers' Examination, Springfield, Ill., Dec. 17, 1918

(*Selected Questions*)

Ques.—Suppose that in a gassy mine the quantity of air passing is 175,000 cu.ft. per min., measured in the return airway and containing 4 per cent. of firedamp, when the barometer is 30 in. (a) What quantity of firedamp is given off in the mine? (b) What is the least decrease of the quantity of air that will render the return air explosive? (c) What increase of gas will render the return air explosive?

Ans.—In this question, the words *marsh gas* should be used in place of "firedamp," when speaking of the gas given off and which forms firedamp only when mixed with air in inflammable or explosive proportions. (a) The quantity of gas given off in this mine is 175,000 × 0.04 = 7000 cu.ft. per min. (b) Taking the lower explosive limit of marsh gas and air as reached when the proportion of gas to air is 1:13, or the gas forms 1/14 of the firedamp mixture, the total volume of air and gas, in the return current, when the explosive point is first reached is 14 × 7000 = 98,000 cu.ft. per min. Hence, the decrease in the quantity of air passing to form this condition is 175,000 — 98,000 = 77,000 cu.ft. per minute. (c) The quantity of air passing before any change is made is 175,000 — 7000 = 168,000 cu.ft. per min. The quantity of gas required to bring this volume of air to its lowest explosive limit is 168,000 ÷ 13 = 12,923 cu.ft. per min. To form this condition in the return airway would require an increase in the quantity of gas given off in the mine equal to 12,923 — 7000 = 5923 cu.ft. per minute.

Ques.—A borehole from the surface is 6 in. in diameter and enters the old workings of a mine. A mixture consisting of 50 per cent. of marsh gas (CH_4) and 50 per cent. of the air is passing up this hole, with a velocity of 130 ft. per min. (a) What is the volume of the flow in cubic feet per minute? (b) What would be its volume if sufficient air were added to bring the mixture up to the highest explosive point?

Ans.—(a) The diameter of this pipe being 6 in. (½ft.) its sectional area is $0.7854(\frac{1}{2})^2 = 0.1963$ sq.ft. For a velocity of 130 ft. per min., the volume of air passing is 130 × 0.1963 = 25.519 cu.ft. per minute.

(b) This being a 50 per cent. mixture of gas and air, the quantity of gas passing up the pipe is one-half the flow or 12.7595 cu.ft. per min. The maximum explosive point of pure marsh gas and air is reached when the mixture contains 9.46 per cent. of gas. The volume of the flow when at this point would therefore be 12.7595 ÷ 0.0946 = 134.88 cu.ft. per minute.

Ques.—How would you proceed to clear a shaft that is filled nearly to the top with carbon dioxide?

Ans.—There are several means that can be adopted to clear out this gas, depending on the equipment at hand. Probably the simplest and most effective method to employ is to bail out the gas, which is much heavier than air, and often difficult to remove in any other way, because it sinks to the shaft bottom owing to its greater density. However, the arrangement must be such at the top of the shaft that the gas will be prevented from flowing back into the shaft when emptied from the bailing bucket.

Where it is possible to utilize the current from a powerful blower or ventilating fan, the gas may be removed by blowing air into the shaft through a flexible canvas tubing, say 12 or 14 in. in diameter. The tubing should be gradually lowered into the shaft as the heavy gas is removed. Or it can be lowered at once to the shaft bottom, provided the air current is strong enough to expel the gas.

Ques.—(a) How is electric current generated before it is transmitted? (b) How is the transmitted electric power utilized?

Ans.—(a) An electric current is generated by the operation of a dynamo driven by a steam engine or other source of mechanical power. The dynamo is then called a *generator.*

(b) The transmitted electric power is utilized by passing the current through a dynamo, which is then called a *motor.*

In the first instance, the revolution of the armature of the dynamo is caused by the power applied to the crank shaft or belt-wheel of the machine. The armature, being thus revolved in the magnetic field of the dynamo, generates an electric current, which makes this machine a *generator.*

In the second instance, the electric current passing through the armature of the dynamo causes it to revolve, by reason of the reaction of the magnetic field of the dynamo on the armature, thus making the machine a *motor* capable of driving other machinery.

Ques.—There is a shaft 50 ft. deep in a hillside, and 500 ft. away is a creek, which is 100 ft. below the level of the bottom of the shaft. Is it possible to drain the water from this shaft into the creek, with a siphon? Explain how this can be done.

Ans.—The theoretical limit a siphon will lift water, or the vertical height of the crown of the siphon above the water in the sump, is 34 ft., at sea level. Allowing, however, for the friction of the flow in the pipe, this theoretical height or lift of a siphon is reduced in actual practice and will not much exceed 28 ft. at sea level, much depending on the length of the siphon, from the suction to the discharge end of the pipe.

The depth of the shaft in this case being 50 ft., it will not be possible to lift the water to the top of the shaft by means of a siphon. In order to drain the water from this shaft by a siphon, it will be necessary to tunnel into the shaft at a height not exceeding 28 ft. above the shaft bottom, assuming a sea-level location.

FOREIGN MARKETS AND EXPORT NEWS

Must Increase Imports to Become An Export Nation

If the United States ever is to rank as the leading exporting nation of the world it must become a greater importing nation than it now is. The foreign trade built up by England during the last decade shows that coal looms as a large factor. This is not so much because her coal fields are near to the European consuming markets (witness the long oversea trips made by her coal-carrying vessels to South American and other ports), but is due to the fact that an outgoing coal freighter from a British port can be considered as a vessel sailing in ballast. The return cargoes in great measure help pay the freight.

Only in extreme cases can a freighter carry coal to a certain destination and return to its home port without a cargo, and where this is done the coal is exorbitantly high in price. It is not the way in which the business is carried on as a general rule. Coal is an exceedingly bulky commodity, and the only manner in which it can be handled conveniently is in bulk. As a consequence, in order for the United States to carry on a successful export business in coal, it must be evident that we must import an equal quantity of bulky material before real economy in transport can be enjoyed.

Of course, what has been said in the foregoing is not the only consideration, though it can well be stated to be the chief one. Other elements that enter into the competitive ability of coals are the physical and chemical qualities, and the cost of placing the cargo aboard ship.

So far as production is concerned the United States easily leads the world in the actual tonnage mined, with England and Germany following. From analyses it would appear that the coals of the Northeastern field of England resemble rather closely coals from our Pennsylvania, Ohio and the Kanawha and Thacker fields of West Virginia; while the Welsh steam coals seem to prove up a little better chemically than our New River and Pocahontas coals. The Welsh anthracites are practically identical to our Pennsylvania anthracite.

In the past the drawbacks to the introduction of American coal in foreign markets were its size, its disintegrating nature and its high cost. Steam coal on reaching destination abroad should be at least 70 per cent. large lumps and pieces, but exports of American coals in recent years have not been maintaining that average. On the other hand, the maximum degradation in a cargo of English coal will not exceed 20 per cent.

Italian Coal Trade

From an authoritative source it is stated that the opposition in Italy to the proposed State monopoly for the sale of coal is growing. The idea was formed for the primary object of increasing the revenue, but it is recognized that this can only be accomplished by the State charging consumers higher prices than could be secured under the old regime. Therefore, the industries of Italy would be placed under a disadvantage compared with other importing countries in respect of the cost of coal. It is felt that the measure would restrict the export manufacturing trade of the country, and for this reason the opposition toward a State monopoly of the coal trade is growing.

Port Facilities of Vigo

Vigo is a city of about 50,000 inhabitants and is one of the most important ports of Spain for emigrant traffic. Before the war as many as 80 trans-Atlantic steamers called in a single month taking thousands of emigrants, principally to Cuba and South American ports. The present port works are insufficient to accommodate the larger vessels, which usually lie off the piers.

There are three piers at Vigo, the largest being little used at present, due to the fact it was defectively constructed. There is also a pier for passengers, which is built of stone and iron and railway cars run on it. It also has a crane with a lifting capacity of 20 tons. The wharf which is principally used, but only by small boats and lighters, is known as the "Commercial" pier, and it has a movable steam crane with a lifting capacity of five tons, besides two hand cranes.

All lighterage is done by a sociedad or combination of lighter owners. There are about 50 lighters available for regular use and they can accommodate 500 to 600 tons each. There are about 20 tugs usually employed for steamers, but their number can be increased if necessary, by hiring some of the hundred odd fishing tugs to be found there. Coal bunkering is done alongside coal hulks and from lighters in the roadstead. Three coal hulks are now available. At present only Spanish coal is procurable, and it costs $34.74 per ton. Before the war Cardiff coal was kept in deposits at Vigo, and it is probable that this will again be the case.

Stevedoring is done by natives, both men and women, who receive 7 pesetas (1 peseta equals $0.193) per eight-hour day. Overtime is paid at the rate of 1 peseta per hour if by day, or 1.50 pesetas if by night. Foremen receive double pay. The mean rate for stevedoring is 1.75 pesetas per ton or cubic meter. Steamers can be loaded or unloaded at the rate of 100 tons per hour.

Loading or discharging coal by the bridge or on the quay costs 1.25 pesetas per ton, but stowing in bunkers is paid for separately at 7 pesetas per man per eight-hour day. Loading or discharging coal from lighters or coal hulks costs 1 peseta per ton, but the price is doubled if there are no winches. As a basis for the cost of handling coal at Vigo it may be noted that the Spanish railway pays 2.25 pesetas per ton for discharging Spanish coal from railway cars onto the quay, where it is kept in deposits and then loaded on steamers as required. To this must be added the usual cost for stowing in bunkers, as stated above. Coal can be delivered at the rate of 100 to 120 tons per hour.

The Spanish press has recently been publishing articles concerning an alleged project of American financiers to build a direct railroad line from Vigo to Irun on the Franco-Spanish frontier and to run steamers from New York to Vigo. The advantage of this port arises from its geographical position which permits the distance for ocean travel between Europe and the United States to be considerably shortened. This is best shown by the following comparison of distances between New York and various European ports:

Exports of Anthracite and Bituminous Coal and Coke from the United States During the Fiscal Year Ended June 30, 1918

(Compiled by Bureau of Foreign and Domestic Commerce)

To	Anthracite Tons	Anthracite Value	Bituminous Tons	Bituminous Value	Coke Tons	Coke Value
Azores and Madeira Islands	.....	.....	315	$2,283	250	$6,194
Belgium	25	$364	.....	.....	.....	.....
Denmark	.....	.....	10	40	.....	.....
France	1,742	18,976	20,116	102,468	12,328	115,980
Gibraltar	.....	.....	800	4,800	.....	.....
Greece	.....	.....	2,894	20,258	.....	.....
Italy	352	3,411	201,220	805,779	1,231	29,595
Norway	5	75	.....	.....	120	2,040
Portugal	260	1,893	39,530	239,375	.....	.....
Spain	.....	.....	44,440	285,151	487	3,920
England	1,658	9,717	41,930	182,835	2,504	26,714
Scotland	.....	.....	4,059	16,480	.....	.....
Bermuda	1,648	16,331	31,118	157,676	.....	.....
British Honduras	.....	.....	343	1,951	5	128
Canada	4,762,635	29,287,856	16,693,062	59,529,991	941,952	6,576,991
Costa Rica	1	23	1,765	9,269	.....	.....
Guatemala	4	122	470	3,122	19	495
Honduras	.....	.....	7,307	35,429	17	251
Nicaragua	.....	.....	3,193	17,537	14	390
Panama	265	2,658	611,413	2,399,325	1,609	34,546
Salvador	3	70	.....	.....	72	2,084
Greenland	.....	.....	703	3,159	.....	.....
Mexico	3,746	36,824	158,464	799,030	284,054	2,337,561
Miquelon, Langley, etc.	128	1,348	.....	.....	.....	.....
Newfoundland and Labrador	8,346	59,825	1,523	5,035	.....	.....
Barbados	191	2,457	61,745	314,209	.....	.....
Jamaica	2	25	34,267	164,440	1	30
Trinidad and Tobago	15	173	28,989	148,275	27	640
Other British West Indies	275	1,987	42,015	224,237	4	106
Cuba	46,913	$305,569	1,094,937	$7,974,281	10,910	$131,215
Virgin Islands	33	192	23,183	127,431	6	165
Dominican Republic	4,722	30,953	24,257	127,179	57	1,365
Dutch West Indies	.....	.....	18,743	89,640	.....	.....
French West Indies	.....	.....	64,814	328,839	203	5,250
Haiti	190	2,479	2,006	9,310	5	135
Argentina	7,399	44,394	247,613	1,367,262	2,459	47,926
Bolivia	4	107	.....	.....	.....	.....
Brazil	798	6,367	625,374	3,593,276	1,422	12,254
Chile	636	8,186	324,278	1,796,269	60,494	560,663
Colombia	31	478	9,186	41,774	86	2,390
Ecuador	.....	.....	8,645	47,178	72	1,400
Falkland Islands	.....	.....	10,338	61,137	.....	.....
British Guiana	.....	.....	3,902	19,692	.....	.....
Dutch Guiana	.....	.....	1,703	8,870	.....	.....
Peru	100	1,240	25,376	151,087	16,571	245,489
Uruguay	.....	.....	109,178	629,034	42	931
Venezuela	38	570	1,896	11,547	47	1,158
Dutch East Indies	.....	.....	.....	.....	3	99
Other British Oceania	1	8	100	2,400	.....	.....
Philippine Islands	.....	.....	34	113	145	6,522
British West Africa	18	240	2,084	10,420	.....	.....
British South Africa	.....	.....	.....	.....	15	420
French Africa	.....	.....	15,014	56,536	.....	.....
Portuguese Africa	3	29	7,827	54,789	.....	.....
Totals	4,842,187	29,844,947	21,051,979	81,980,218	1,337,321	10,155,047

	Miles
New York to Havre, France	3,300
New York to Bordeaux, France	3,154
New York to Cherbourg, France	3,096
New York to Lisbon, Portugal	2,927
New York to Vigo, Spain	2,883

England's Coal Trade in 1918

In taking a general survey of the coal trade in the United Kingdom during the year that has just come to an end, says the *Colliery Guardian*, Jan. 3, 1919, it is necessary to keep in view the fact that the year 1918 has been one of the most critical epochs of British history.

Production, of course, has suffered, and the output for the year, when the full figures are available, will show a considerable deficiency, even when compared with the reduced production of 1917. From the figures published by the Coal Controller for the 10 months ending Oct. 12 last, the total deficiency up to that date was 16,490,500 tons, or about 8.4 per cent. The cause of this decline in output is mainly to be attributed to the steady depletion of manpower brought about by the combing-out of the younger miners, in consequence of the urgent demand for men. The withdrawal from the mines of 50,000 of the best workers could not have resulted in anything else but a loss of approximately 1,000,000 tons of coal per month. But other causes have also contributed their share of the deficiency, and among them perhaps one of the most potent has been the irregular supply of tonnage, which in some cases, particularly in South Wales, was responsible at times for irregular working at the collieries. In the early part of the year this irregularity was the subject of a special inquiry by the Coal Controller, when serious efforts were made to find a remedy. The most favored suggestion, at the time, was a scheme for a more uniform distribution of the available business by apportioning orders, through the medium of the local coal committees, among the collieries in a position to execute them.

Such a scheme, however, would scarcely alleviate all the difficulties surrounding the transport question. Not only has the tonnage shortage aggravated the position in the exporting districts, but even in the case of inland trade the movement of coal has been attended with difficulty. The Coal Controller's scheme for inland distribution was not an unqualified success, and has caused a certain amount of dissatisfaction in some districts. Neither have coal owners been altogether satisfied with the pooling arrangements for cars, for, upon the whole, it is questioned whether the mobility of the car supply has been sensibly increased by this means. With regard to tonnage deficiency, the effect has been unequal. Thus while shipments from Glasgow and the western ports were only a little below prewar figures, those from Fife and the Forth have been seriously reduced, partly because less tonnage was available on the east coast, and partly because the ports of Bolness, Grangemouth, Granton and Burntisland have been largely taken over by the Admiralty.

The difficulties of coal distribution have been materially simplified since the armistice, and the Coal Controller has been able to issue fresh instructions to collieries and dealers, with a view to improving the supply of house coals, of which the delivery, except, perhaps, in the London area, has threatened to be rather short. To this end, collieries have been told to send, for household purposes, both manufacturing and steam coals as an emergency measure, which is rendered posible by the reduced demand for munition purposes. It is doubtful, however, whether such a diversion of manufacturing fuel can be effected without endangering the reserves at work. Some industries have not been any too well supplied all the year. Thus, the pottery trade was rationed to 75 per cent. of the 1916 supply, but has not been able to secure even this reduced amount. Similar restrictions in fuel supply have been felt in other industries, especially those not directly concerned with munitions; and it is clear that the country has been very near to a coal crisis, the escape from which may be fairly attributed to the skill with which Sir Guy Calthrop has dealt with a very delicate situation. Naturally, his methods have been severely criticized, but the fact remains that thus far the deficiency of output has been so manipulated that nobody can yet very seriously complain.

As far as prices are concerned, these have maintained a high level, at which they seem likely to remain for some considerable time. War-wage increases have been followed by successive rises in the limitation price of coal. The exporting collieries, also, have had their particular grievance removed by the abolition of the unequal treatment of export coal to France and Italy. Any advantage, however, which might have accrued to the coal owners from these increases has been checked by the terms of the Coal Mines Control Agreement (Confirmation) Act, which passed through Parliament in the early part of the year. Under this Act the colliery owners have to surrender 95 per cent. of any excess profits, 15 per cent. of which goes to the Controller's guarantee fund. Possibly a more serious result of this Act, however, is the restriction which it has entailed upon the internal economy of coal mine management. It is true that the effect has lately been somewhat relaxed, but it has operated as a check upon development.

Details of the coal export trade of the United Kingdom for the 11-month periods ending Nov. 30, 1917 and 1918, as supplied by Consul General Skinner, appear in the following table:

To	1917 Tons	1917 Value	1918 Tons	1918 Value
Sweden	553,082	3,775,171	997,945	9,078,747
Norway	967,395	6,435,357	1,187,510	11,319,761
Denmark	778,816	5,155,302	973,940	8,812,020
France	16,495,565	102,579,504	15,314,128	106,848,451
Italy	3,789,909	24,427,441	3,778,930	26,287,315
Gibraltar	1,102,886	7,248,803	1,508,654	10,962,599
Malta	1,601,425	11,406,600	1,112,919	8,097,598
Egypt	1,448,459	9,707,153	1,620,524	11,679,960
Totals	**32,801,977**	**$211,503,367**	**29,660,615**	**$216,815,982**

Coal Situation in Canada

The unusually mild weather this winter has saved the coal situation in Canada. Fuel conditions are now easier there than they have been for months past, owing to the absence of severe weather. The mild weather prevalent in the United States has also reached Canada, and as a result coal has been going across the border in steady quantities.

Bunker Coal Shipments from United Kingdom in December

The quantity of bunker coals shipped on vessels engaged in the coastwise trade during December last from the United Kingdom amounted to 84,602 tons. Of this total only 7398 tons were bunkered at Bristol Channel ports, while 31,176 tons were shipped at the Northwestern ports, 15,744 at the Northeastern ports, and 14,208 tons from the West Coast of Scotland. The coastwise trade in coal for the same month totaled 730,359 tons, of which 104,625 tons were shipped from the Bristol Channel ports, 159,687 tons from the West Coast of Scotland, 103,553 tons from the Northwestern ports, and 314,300 tons from the Northeast Coast.

Foreign Freight Rates

W. W. Battie & Co.'s coal trade freight report for Feb. 17:

Steam—Havana, $7.50, 600 tons dis.; Cardenas or Sagua, $9, 300 tons dis.; Cienfuegos, $9, 500 tons dis.; Caibarien, $9.50, 200 tons dis.; Guantanamo, $8.50, 500 tons dis.; $9, 400 tons dis.; Manzanillo, $9.50, 300 tons dis.; Bermuda, $9.50, and Bermuda, p. c. and dis. free, 300 tons dis.; Kingston, $9.50, 400 tons dis.; St. Thomas, $10, 500 tons dis.; St. Lucia, $11, 500 tons dis.; Santiago, $8.50, 500 tons dis.; $9, 400 tons dis.; Barbados, $11, 500 tons dis.; Port of Spain, Trinidad, $11, 500 tons dis.; Curacao, $10.50, free p. c. Curacao, 500 tons discharge.

Sail (maximum) — Para, $15.50 net; Bahia, $18.50 net; Pernambuco, $18.50 net; Rio, $19.50 net; Santos, $19.50 net; Buenos Aires, $18.50 net; La Plata, $18.50 net; Montevideo, $19.50 net. (Gross rates $1.50 per ton in excess of net rates). On all the foregoing rates, charterers pay vessel's towage to coal port. To Nitrate Range, $16.50 gross prepaid. (Same rate steam.)

The Chartering Committee's rate by steam is $19.50 net to Rio or Santos, $18.50 net to Buenos Aires and $19.50 net to Montevideo.

Leading exporters of American coal have established committees through the National Coal Association to appeal to the Shipping Board to increase tonnage available for carrying coal to Central and South America.

Hampton Roads Coal Exports

				Cargo	Bunkers
NORFOLK					
Lamberts Point					
Feb. 1	Nor. S.S. Johan Ludw. Mowinckel	Rio de Janeiro, Brazil		3,584	968
Feb. 1	Am. S.S. Point Loma	Pearl Harbor, Hawaii		2,149	480
Feb. 1	Nor. Bk. Abyssinia	Montevideo, Uruguay		1,630	
Feb. 1	Am. S.S. Caoba	Vera Cruz, Mexico	Coke	702	
Feb. 1	Am. S.S. Bellatrix	Rio de Janeiro, Brazil		4,198	1,328
Feb. 1	Am. S.S. Lake Callicoon	Barbados, B.W.I.		2,985	452
Feb. 3	Am. S.S. Lake Otsquago	Barbados, B.W.I.		2,815	319
Feb. 3	Am. S.S. Dalana	Mollendo, Peru		2,755	599
Feb. 3	It. Bk. Ascensione	Bagnoli, Italy		2,326	
Feb. 5	Dan. S.S. Kentucky	Santos, Brazil		3,371	1,182
Feb. 5	Dan. S.S. H. Pontoppidan	Caldera, Chile		3,361	914
Feb. 5	Am. S.S. Larenberg	Rio de Janeiro, Brazil		3,895	1,009
Feb. 6	Am. S.S. Biran	Rio de Janeiro, Brazil		3,033	1,221
Feb. 6	Am. S.S. Procyon	Montevideo, Uruguay		4,066	1,635
Feb. 6	Dan. Bk. Holdana	Buenos Aires, A. R.		1,299	
Feb. 7	Am. S.S. Point Lobos	Honolulu, Hawaii		2,973	
Feb. 7	Am. S.S. Columbia	Iquique, Chile		2,009	
Feb. 8	Am. S.S. Point Judith	Rio de Janeiro, Brazil		3,112	
Sewalls Point					
Feb. 1	Am. S.S. Lake Ormoc	Havana, Cuba		2,820	349
Feb. 4	Am. S.S. Ulysses	Cristobal, C. Z.		12,022	1,191
Feb. 6	Am. S.S. Achilles	Cristobal, C. Z.		12,041	1,185
Feb. 6	Am. S.S. Bayview	Havana, Cuba		1,991	204
NEWPORT NEWS					
Feb. 1	Nor S.S. Ottar	San Juan, P. R.		1,963	249
Feb. 1	Nor. Bk. Vik	Rio de Janeiro, Brazil		3,105	
Feb. 1	Am. S.S. Lake Charles	Neuvitas, Cuba		2,300	348
Feb. 1	Nor. Bk. Sirdal	Rio de Janeiro, Brazil		1,772	
Feb. 1	Am. Sc. Rose E. Murphy	San Juan, P. R.		920	
Feb. 3	Am. S.S. Corsicana	Antilla, Cuba		2,710	283
Feb. 4	Am. S.S. Randwijk	Pernambuco, Brazil		3,225	583
Feb. 4	Am. Sc. Gracie D. Chambers	Santo Domingo City, D. R.		486	
Feb. 5	Am. S.S. Saccarappa	Rio de Janeiro, Brazil		6,510	
Feb. 5	Am. S.S. Lake Gormannia	Trinidad, B. W. I.		3,064	639
Feb. 6	Am. Sc. Ed R. Smith	Ponce, P. R.		792	
Feb. 7	Am. Sc. Wm. H. Draper	Santo Domingo, D. R.		453	
Feb. 7	Dan. S.S. Henry Tegner	Neuvitas, Cuba		2,028	192
Feb. 7	Dan. S.S. Erik II	Antilla, Cuba		2,692	184

COAL AND COKE NEWS

Harrisburg, Penn.

A bill introduced into the House by Representative Sinclair of Fayette County, provides that it shall be lawful for all incorporated or unincorporated churches, cemetery companies and burial associations now prevented by charter restrictions or otherwise from leasing or selling coal or other minerals owned by them, to sell, lease or convey the mineral, subject to such conditions as will insure the support of the overlying surface and subject also to the requirements that at least 50 per cent. of the coal and other minerals be left in place, properly distributed to support the surface, and that no mining be done or permitted closer to the surface than 200 ft. The bill further provides that the funds derived from the sale of the coal be used for the purchase of additional land, or for the improvement, beautifying, endowment and maintenance of the properties.

Deputy Attorney General Swoope has rendered an opinion arising in the Game and Fisheries Department, in which he informs the Commissioner of Fisheries that he should first notify mining companies charged with the polluting of streams to stop, and if they refuse evidence should be secured for prosecution.

A State Commission to investigate the possibility of making the Susquehanna River navigable is provided by a bill introduced into the House by Representative Hess, who for many years has been Chairman of the House Committee on Mines. The Commission is to be allowed $5000 for expenses, but the members are to receive no compensation. A consulting engineer is to be named. The bill attracted much attention among legislators as there has been much discussion of the project, as it is contended that the making of the river navigable would reduce the cost of coal, as the river runs through the heart of the anthracite region and through part of the bituminous coal fields.

Uniontown, Penn.

Within the past three weeks the Connellsville coke region has undergone a rapid and orderly readjustment to comply with immediate post-war requirements that is considered no less remarkable than was its quick mobilization for war under the regional fuel administration. From an industry brought together under indirect control and keyed to the highest point of maximum efficiency, the Connellsville coke region has been returned to its own resources and is now proceeding at a rather leisurely gait in order to get its breath for the boom believed assured when the iron and steel reconstruction period gets under way.

When Government restrictions were lifted Feb. 1 the average weekly production was 650,000 tons (coal). It has steadily declined at the rate of 40,000 tons (coal) weekly by an effective curtailment policy made necessary by the closing down of a number of blast-furnace operations. There is every indication that production in the immediate future will anchor around 525,000 tons (coal) weekly, with coke at 225,000 tons. Close observers believe that the bottom in curtailment was reached this week and that until there are more encouraging developments in the industry it will become stabilized at 525,000 tons (coal) weekly.

Limited employment for everybody and no reduction in shifts is the policy adopted by operators to prevent an unemployment problem in the coke region. All plants generally are working on a four- and five-day basis, the H. C. Frick Coke Co. this week suspending operations for a day at a number of plants. Heretofore the corporation plants had been working six days but had eliminated extra shifts, but independent operators have been observing lay-off days for a month or more. There has been no general revision of present high wage scales and none is contemplated. One small operation, the Harah Coal and Coke Co., this week gave its men the choice of accepting a 30 per cent. wage reduction or closing down the plant. They accepted the reduction.

Pittsburgh, Penn.

It is being persistently rumored in and around Pittsburgh that plans are under way for a merger of the Hecla Coal and Coke Co. and the United Coal Corporation, both Pittsburgh concerns and in both of which J. H. Hillman, Jr., of Pittsburgh, is the majority stockholder, being president of the former and a director in the latter.

The Hecla Coal and Coke Co. operates several mines and coke-oven plants in Fayette County, in the Connellsville coke region. The United Coal Corporation operates mines in Allegheny, Westmoreland, Fayette and Somerset Counties, and through its subsidiary, the Merchants Coal Corporation, the Tunnelton mine at Tunnelton, Preston County, West Virginia.

Rumor also has it that part of the official family of the new corporation will be constituted as follows: J. H. Hillman, Jr., president of the Hecla Coal and Coke Co., to be chairman of the board; Tracy W. Guthier, president of the United Coal Corporation, to be president; William L. Affelder, general manager of the Hecla Coal and Coke Co., to be general manager; and Harrison T. Booker, general superintendent of the United Coal Corporation, to be general superintendent.

The Hecla Coal and Coke Co. was organized a couple of years ago by a merger of the Bessemer Coke Co., the Isabella Connellsville Coal and Coke Co. (at one time a subsidiary of the United Coal Co. and acquired during the United receivership by the Hillman interests) and other smaller Hillman interests.

The United Coal Corporation was founded July 1, 1916, by the reorganization of the United Coal Co. and its subsidiaries, the Naomi Coal Co., the Pittsburgh & Baltimore Coal Co. and the Jenner Quemahoning Coal Co., which had been in receivers' hands since 1913. On July 1, 1917, it acquired a majority of the bonds of the Merchants Coal Co., another subsidiary of the old United, and took those properties over from the receivers and organized the Merchants Coal Corporation, since operated as a subsidiary company.

Charleston, W. Va.

Much idleness among miners prevails in the Fairmont district as a result of numerous suspensions of operations following a slump in the market, the number of idle miners on one division of the Baltimore & Ohio being between 150 and 175. This is due not solely to a lifeless market but to the policy of railroads not to purchase coal except at excessively low prices. The same conditions prevail through the district. The car supply for the Fairmont region is far in excess of the loading and shipment of such cars. An average of 3000 cars a day is still being supplied to the mines. Loadings average anywhere from 500 to 800 cars a day, with a small percentage of such cars moving westward. Since Feb. 1 some of the larger companies in the district have suspended operations until general conditions show improvement.

General apathy featured conditions in the Kanawha district during the week ending Feb. 8, there being a smaller output in that period than during the earlier weeks of the year, production for the week ending Feb. 1 being only 81,000 tons. Definite figures are lacking as to production owing to the discontinuance of reports to some district associations and district fuel officers, but general conditions are a sufficient index. As production at times reached 220,000 tons a week during the war, it will be seen just how materially curtailed the output has been. Prices are still holding up well despite the general apathy.

Idleness among the mines also haunts the New River and Winding Gulf fields, where the general slackening of demand and lack of orders has caused many companies to cease operations for the time being, being unable to dispose of their product, with railroad embargoes in addition holding up shipments, notwithstanding the fact that some of the old market areas of both the New River and Winding Gulf districts have been restored. However, there is little need for coal there at this time, and consequently the enlarged territory is not affording much additional outlet. However, the smokeless product of the New River district will make it possible to recover from the present slump before some other districts. The advance in price after Feb. 1 would indicate that. However, labor trouble may affect the mines of the district later on.

In the Pocahontas and New River districts the total output last week was 385,277 tons, which is considered a fairly good output in view of all conditions, indicating a fairly good demand for Pocahontas coal despite the general stagnation. Production of coke declined from 52,000 tons to 44,677 tons.

In common with other districts there were heavy production losses in the Guyan or Logan mining district, the output running less than half the usual full time production. Indeed, the Logan mining district has been affected to the same extent as the Kanawha district by present market conditions, since most of the product of the mines of the district is shipped to the West. Coal will continue to be shipped through a forwarding bureau at Russell, Ky.

New York, N. Y.

The award of the contract for supplying about 300,000 tons of bituminous coal for the transport service, New York harbor delivery, is expected to be made the latter part of this week. The bids, which called for a tonnage to be called for at the rate of about 60,000 tons a month for five months beginning Feb. 1, were opened in the Army offices, 104 Broad St., on Feb. 10. Altogether twenty coal concerns submitted proposals, the prices being for net tons, f.o.b. New York harbor loading ports, and are exclusive of war freight tax except where specified. The bids follow:

	Per Ton
W. A. Marshall & Co., Pools 1, 9, 10 and 71	$4.82
Stineman Coal & Coke Co., Pools 1, 9, 10 and 71, for April, May and June	4.87
American Fuel and Shipping Co., Pools 1, 9, 10 and 71	4.47
E. I. du Pont de Nemours & Co., Pools 1, 9, 10 and 71, for February and March	4.87
Whitney Coal Mining Co., Pools 1, 9 and 10	4.54
Rockhill Iron and Coal Co., Pool 1	5.09
Rockhill Iron and Coal Co., Pool 10	4.49
George D. Harris & Co., Pool 10	4.77
Alden Coal Mining Co., Pools 1, 9, 10 and 71 (Two delivery periods)	4.36 and 4.49
Coale & Co., Pools 9 and 71	4.62
Maryland Coal and Coke Co., Pool 9	4.88
Berwind-White Coal Mining Co., Pool 1	5.60
Emerson & Morgan, three bids, Pools 10, including war tax	4.65, 4.65 and 4.85
Pennsylvania Coal and Coke Corporation, Pools 1, 9 and 71	5.02
Pennsylvania Coal and Coke Corporation, Pool 10	4.87
Thorne, Neale & Co., Pool 10	4.92
Mountain Coal Co., Pool 1	5.42
Consolidation Coal Co., Pools 9 and 71	4.87
Campbell, Peacock & Kinzer, Pools 9, 10 and 71	5.00
N. B. Nicoll & Co., Pools 10 and 71	5.35
Knickerbocker Fuel Co., Pool 9	4.66
Knickerbocker Fuel Co., Pool 10	4.41
Davis Coal and Coke Co., Pools 9 and 71	4.80

Victoria, B. C.

The total amount of coal produced by the collieries of Vancouver Island for the month of January, 1919, was 158,327 tons. This is 18,040 tons more than was produced during December, 1918, and 55,632 tons more than the production of November, 1918. The total of 158,327 tons only lacks 2831 tons of being equal to what was produced by all the coal mines of the Province in November, 1918, and is 10,000 tons in excess of the largest production in the history of the Vancouver Island collieries.

The Canadian Collieries (D), Ltd., leads in production with a total of 80,696 tons from its different collieries, with the Canadian Western Fuel Co. second with a

production of 64,404 tons from its Nanaimo colliery.

The new No. 5 mine opened by the Canadian Collieries (D), Ltd., at South Wellington has an output of 7813 tons for January. The Granby Co.'s new mine at Cassidy, V. I., produced 2446 tons. Both of these mines should now rapidly increase their production.

The Canadian Western Fuel Co.'s new Wakesiah mine is now nearing the time when it will become an active producer, which should augment that company's tonnage in the near future. Both shafts are now down to coal and connected, and arrangements are under way laying out the shaft bottom arrangements.

These three new mines should give a good account of themselves during 1919, and considerably increase the tonnage produced from the Vancouver Island mines.

PENNSYLVANIA

Anthracite

Scranton—When the Continental colliery of the Delaware, Lackawanna and Western Railroad Co. closed recently, Thomas McGraw had been employed for fifty-one years at the colliery.

Upper Lehigh—Employees of the J. S. Wentz Co. are being sent to Raven Run, Schuylkill County, where the firm is opening a new operation. On account of the slack time at the mines the Lehigh Valley R. R. has laid off 20 firemen and trainmen on the Mahanoy division who formerly were members of coal crews.

Hanover—George Lazarus and others, lessors of coal land, have brought proceedings in equity against the Lehigh and Wilkes-Barre Coal Co. and ask pay for all coal lost by reason of excess of waste by modern methods of mining and preparation since the execution of a lease, and also pay for culm and coal taken from the land. The suit involves thousands of dollars.

Exeter—The closing down of the Stevens colliery of the Lehigh Valley Coal Co. will not materially affect the 200 or more employees as the company has arranged for their employment at the Exeter colliery. The superintendent, David W. Evans, will also go along with the men. He will have charge of the Checker and Pittston veins. The officials of the company state that the closing down of the colliery is for economy and concentration.

Summit Hill—A number of men employed in the industrial plants throughout the Panther Creek and Lehigh Valleys are being employed by the Lehigh Coal and Navigation Co. The lack of man power is no longer felt to any considerable extent. There are evidences to show that the company intends to reduce wages of its employees, but the mine workers say they will not stand for any decrease, especially at this time.

Throop—A serious squeeze has caused considerable damage to the workings of the Pancoast colliery, controlled by the firm of Dickson & Eddy, of New York. Fortunately the cave started on the evening of Feb. 8, when no men were in the mines, but the officials were able to rescue all the mules. It is said that the squeeze is affecting the main shaft, which has started to bulge, and may ruin the mine. In 1911 seventy-three men lost their lives at this plant due to a mine fire.

Hazleton—The Spring Brook and Spring Mountain collieries of the Lehigh Valley Coal Co. suspended operations indefinitely on Feb. 10. Foremen are manning the pumps. A total of 680 men are idle. Work on a proposed slope at Spring Mountain and a 500-ft. haulage tunnel planned to connect the two collieries has been stopped by the order to suspend. "Independents," with the exception of G. B. Markle Co., are working from one to three days a week. Lehigh Valley collieries are working from six to seven hours a day when ordered to operate.

Bituminous

Waynesburg—John Lantz, of Gilmore township, has sold a one-half interest in a tract of coal containing 80 acres to J. B. Fordyce.

Morgan—The White mines of the H. C. Frick Coke Co. shipped their last car of coal Feb. 7. They have been abandoned by the company and conclude this company's activity in this valley. The company recently abandoned the Valley mine.

Youngwood—The Pennsylvania R. R. has completed more plans for the improvement and extension of the Youngwood Yards. A new sectional roundhouse will be erected and a new turntable installed. During the past year many improvements have been made in the yards to care for the increased traffic in this territory.

Point Marion—The Locust Hill Coal Co. secured a temporary court injunction restraining P. J. Joyce from acting as general manager or interfering with the performance of the duties of the office, which is now held by W. J. Lester, his successor. Mr. Joyce was elected some time ago at a salary of $5000 per year.

Star Junction—Fire destroyed one of the new houses being erected here by the Washington Coal and Coke Co. Several of the houses were in process of erection at the time and it is thought to have been caused by a fire started in a small stove by the carpenters during the day time. The fire was confined to one house.

Pittsburgh—Thomas S. Lowther, of Indiana, Penn., secretary of the Bituminous Mine Inspectors' Association, has called a meeting of all the examining boards of the thirty bituminous districts for Mar. 7 at the Seventh Avenue Hotel. The purpose is to set dates for the annual mine foremen's and firebosses' examination and to discuss the form of questions to be included in the examination.

Uniontown—The river tipple and trestle of the Hecla Coal and Coke Co. located at Isabella, Fayette County, on the Monongahela River and the Pittsburgh & Lake Erie R.R., was completely destroyed by fire on Feb. 7. The fire was caused by a short circuit in the conduit wiring which was located at the river end of the tipple. The tipple was a frame structure and was built about a year and a half ago. The loss will not affect the producing and shipping facilities as the greater bulk of the coal and coke was shipped by railroad. Through the heroic efforts of the officials of the company the railroad tipple was saved. The loss is estimated at about $30,000, which includes the conveyor belt, valued at $5500. The tipple will be rebuilt. J. H. Hillman, Jr., of Pittsburgh, is president of the Hecla Coal and Coke Co., and W. L. Affelder, of Pittsburgh, is general manager.

Brownsville — The Banning-Connellsville Coke Co., on the Baltimore & Ohio R.R. between McKeesport and Connellsville on the Youghiogheny River, has indefinitely suspended operation of its plant at Banning, consisting of a large mine and 76 coke ovens, on account of slack business conditions. The company ships both coal and coke. The H. C. Frick Coke Co. has also closed its White mine near Morgan, Fayette County. It is reported that the employees of the Harah Coal and Coke Co. have accepted a wage reduction of 25 to 30 per cent. to keep running.

The Alicia mine and 400 coke ovens of W. Harry Brown, just above Brownsville on the Monongahela River, were closed down on Feb. 11 for an indefinite period, on account of lack of business. Most other operations in the Connellsville coke region are being greatly curtailed. The same is also true of the mines in the Pittsburgh district.

WEST VIRGINIA

Minden—Without orders for their product an unusually large number of mines in both the New River and Kanawha fields have suspended operations. One of the largest companies affected is the New River Consolidated Coal Co. whose mines at this place were shut down about Feb. 1 for an indefinite period, employees being told that it would be wise to look elsewhere for employment. As many as one thousand men are left without employment as a result of this shutdown. Heretofore the Minden mines have been operated regularly.

Morgantown—Damage to the extent of approximately $5000 or $6000 was done by a runaway trip of forty mine cars which demolished the tipple of the No. 5 mine of the Elkins Coal and Coke Co. on Deckers Creek, Wednesday, Feb. 5. There is a heavy grade from the mouth of the mine to the tipple below. When the string of cars got beyond control men in the tipple below, warned by the roar of the cars, fled in every direction. There was no one to manipulate the derailing switch and the cars crashed into the tipple, crumpling it up as if it had been so much paper.

OHIO

Canton — The Stark County Coal & Limestone Co., recently formed, will soon start a stripping operation about seven miles southwest of Canton. A steam shovel will be installed. It is proposed also to mine limestone, which is found in the same locality.

Corning—The Essex Coal Co., of Columbus, has opened a new mine on the Sunday Creek side of the Hocking Valley, near Corning. The mine has a shaft 130 ft. deep located in the center of the 500-acre tract, which contains a seam approximately 12 ft. thick. The capacity is 2000 tons daily. The Toledo & Ohio Central R.R. serves the property. It is operated by a subsidiary company known as the Ohio Mining Company.

INDIANA

Clinton—A gas explosion at Jackson Hill No. 5 mine recently caused the death of three men, one being Robert Laird, assistant mine boss, and the other two laborers. The explosion occurred at seven o'clock in the morning when only a few of the men were working. These men reported the accident and organized a rescue party.

Bicknell—The American mine at Bicknell has been called the "one million ton mine," because of its feat of sending to market last year more than one million tons of coal, which is one-twenty-ninth of all the coal mined by the 400 mines of Indiana last year. A second mine has been sunk by the American company at Bicknell, and a third one is to be sunk soon, each of these to be larger than the present holder of the world's record.

Belleville—Seven men were trapped in the Little Oak mine recently when a fire started in the motor barn underground. Two of the seven men made a detour of three miles to get to an oulet, where they were stopped from ascending by dense smoke. They were compelled to make another detour of two miles before they were able to make their exit through an old air hole. Twelve men were in the mine at the time the blaze started but only seven were trapped. The fire started from a torch used by men making repairs on motors. Five tanks containing 30 gal. of gasoline each were hurriedly removed to a place of safety. About 300 men will be thrown out of work until repairs are made.

ILLINOIS

Carlinville—The Chicago & Alton Railway Co. has notified Mulville Brothers to commence as soon as possible the work of putting in double track from Nilwood, Ill., to Carlinville. This new work will mean double track all the way from Chicago to Carlinville and will enable the movement of an increase tonnage to and from the mines of the Standard Oil Co. at Carlinville and Schoper.

Murphysboro—The Murphysboro Mining Co., with headquarters in St. Louis, Mo., is prospecting for coal on land along the Groves and Sand Ridge branch of the Illinois Central. Options have been secured on more than 2000 acres of land in Ora township, and testing has been finished on part of it. Drilling is under way now and has been for the past two weeks or more. Numerous mines have been opened in Ora township during recent years.

De Soto—The Benton-Big Muddy Coal Co. is sinking a mine north of De Soto. The Union Colliery Co., which is now operating the largest soft coal mine in the world north of Elkville, at Dowell, known as the Kathleen mine, is preparing to open another mine east of Elkville, probably equally as large as the Kathleen mine. Canalization of the Big Muddy River from these coal fields may take place at some future date, as it would furnish a water freight transport from the coal fields to St. Louis and Chicago, with an extension of a canal from the Big Muddy at Sand Ridge to the Mississippi River and a lock dam at Sand Ridge.

KENTUCKY

Cary—The Federal Coal Co. at this place, lost a commissary by fire on Feb. 10, loss being estimated at $25,000, with insurance of $10,000. Incendiary origin appears to be proven, as the building was found on fire at three points.

Straight Creek—The Liberty Coal and Coke Co. has secured fresh contracts, which it states will insure fair operation for some weeks to come. The mines have been operating less than half time for several weeks, but expect to go to a full-time basis.

OKLAHOMA

Muskogee—The office of United Mine Workers of District 21 at this place has been advised that the Choctaw Coal Mining Co. has closed down its mine at Coalgate, thereby throwing 260 men out of employment. It is officially announced that more than 600 men were affected by the curtailment of mining operations at Lehigh, Okla. The operators assign the mild winter and the fact that the vast majority of domestic consumers were induced to lay in their winter's supply of coal last summer, thereby decreasing the immediate demand, as the cause for the curtailment of coal-mining operations. All wholesale and retail coal dealers in Oklahoma and Texas, who normally depend on the Oklahoma fields, report large stocks of coal on hand with small demand.

Marshall—Lignite in large quantities has been found near here. A movement is on foot for the organization of a company to mine the fuel, which is said to be of exceptionally good quality.

Howe—The Texas Steel Co. of Beaumont, Texas, through its president Col. L. P. Featherstone and its secretary, W. A. Brown, has purchased 51 per cent. of the capital stock of the Howe-McCurtain Coal and Coke Co., of Howe, Okla. It is planned to operate the coal mines and 100 coke ovens of this company located at this place to full capacity and to ship the coke to the furnaces of the Texas Steel Co. at Rusk, Tex., to be used in reducing the brown iron ores of East Texas to pig iron. Later it is planned to ship the coke to Beaumont for operation of the furnaces of the Texas Steel Co. now being built there. It is declared that the iron reduction business will be revolutionized, as there is an unlimited quantity of iron ore in East Texas and the low sulphur content coke from the Howe ovens will make possible the reduction of this ore at a cost from $5 to $6 a ton less than it is possible to reduce the ores in the Pennsylvania iron belt. The Howe ovens will have a capacity of 600 tons a day, and it is planned to ship this entire output to Texas.

MONTANA

Roundup—The Republic Coal Co., with fifty less men employed and twelve less operating hours last year exceeded the highest previous twelve months' production record, made in 1916, by 45,575 tons, according to Superintendent William Redshaw. The 1916 tonnage was 615,000 tons as compared to 659,575 tons for 1918.

WASHINGTON

Cokedale—Satisfactory settlement of a strike declared by the new union of coal miners here has been announced. A new agreement between the men and the Cokedale Coal Co. has been drawn up.

Colville—The Colville Valley Coal Co. has now driven its shaft a distance of 197 ft., where it encountered a coal seam 7 ft 9 in. thick and lying between well defined walls. The shaft is being sunk on an incline of 31 degrees.

Personals

John Kaiser, of Columbus, Ohio, formerly with the General Hocking Fuel Co., has accepted a position to cover Ohio for the Elk River Coal and Lumber Co.

H. R. Blackford, recently chief engineer for the Consolidated Coke Co., Grays Landing, Penn., has been made general superintendent of all the mines of the company.

D. S. Hanley has been appointed general sales manager of the Pacific Coast Coal Company, of Seattle, Wash., with headquarters at 563 Railroad Ave., South, Seattle.

C. M. Snyder has been appointed mine inspector for the United Coal Corporation of Pittsburgh, Penn. He has been superintendent for one of the Pittsburgh Coal Co. mines.

Wilmot Jones, lately with the United States aviation service, has been discharged and has been appointed superintendent of the new Raven Run Coal Co. colliery at Raven Run, Penn.

Theodore R. Hermanson, formerly of the Harrison Works of the Worthington Machinery Corporation, has become associated with the Epping-Carpenter Pump Co., of Pittsburgh, Penn., as works manager.

Edward J. McKernan, chief clerk at the Lehigh Coal and Navigation Co.'s colliery at New Philadelphia, has been appointed sales manager for the subsidiary companies of the Lehigh Coal and Navigation Co.

Albert Dalley, Knightsville, Ind., has been appointed assistant state mine inspector by the state industrial board of Indiana. Mr. Dally succeeds William Moore, of Terre Haute, Ind., who resigned recently.

C. C. Slater, who has been manager of a mine in the Monongehela Valley, Pennsylvania, has been made manager of the Columbus Railway, Power and Light Co., of Columbus, Ohio. He has resigned his position at the mine.

George H. Ruppert who, before his entry into the chemical warfare branch of the service had charge of a sodium-ferro cyanide department of the Semet-Solvay Co., has accepted a position as advisory engineer with the Powdered Coal Engineering and Equipment Co., of Chicago, Ill.

Willis B. Clemmitt has joined the engineering staff of the Powdered Coal Engineering and Equipment Co., of Chicago, Ill., in the capacity of advisory engineer. Mr. Clemmitt was formerly assistant superintendent of the open-hearth department of the Central Iron and Steel Co. at Harrisburg, Penn.

J. H. McMillan, Provincial District Inspector of Mines for the Prince Rupert (B. C.) District, has resigned in order to take the position of general manager of the Jasper Park Collieries, Ltd., operating in the Province of Alberta. Mr. McMillan's headquarters will be at Pocahontas, where the company's largest colliery is situated.

R. B. Hullhorst, formerly Northwestern sales manager, with an office in Minneapolis, for the Old Ben Coal Corporation, has resigned from that concern and made a connection with C. M. Moderwell & Co., of Chicago. It is understood that Mr. Hullhorst is financially interested in Moderwell & Co., and will represent them in the Northwest, having his headquarters in Minneapolis.

Ainslie A. Gray, who served the United States as major during the war period, has received his honorable discharge and has opened offices at 1547 Marquette Building, Chicago, Ill., under the firm name of A. A. Gray & Co. The organization will help solve manufacturers' problems in production, advertising and selling. It will handle accounts in trade, technical and national mediums.

Brigadier General Richard Coulter, of Greensburg, Penn., president of the Keystone Coal and Coke Co., one of the large operating companies in Uniontown, Penn., was chosen at a recent meeting of the Pennsylvania Democratic State Committee as the party's candidate for Congress from the Westmoreland-Butler district, to succeed the late Congressman E. E. Robbins. The election will be held Mar. 4.

T. W. Armstrong, widely known in petroleum circles, has been appointed second vice-president of the Hulburt Oil and Grease Co., Inc., manufacturers of petroleum products at Philadelphia, Penn. Mr. Armstrong will have direct charge of the Pittsburgh office and under his supervision will be the mining division of the company, specializing in the lubrication of mine equipment. Mr. Armstrong was formerly with the Keystone and Pennsylvania lubricating companies and is known throughout the state as a most efficient lubricant engineer.

Coming Meetings

New England Coal Dealers' Association will hold its annual meeting March 19 and 20 at Worcester, Mass. Secretary, C. R. Elder, Boston, Mass.

National Foreign Trade Council will hold its sixth convention at the Congress Hotel, Chicago, Ill., April 24-26. Secretary, O. K. Davis, 1 Hanover Square, New York City.

Canadian Mining Institute will hold its annual meeting March 5-7 at the Windsor Hotel, Montreal, Canada. Secretary, H. Mortimer-Lamb, Drummond Building, Montreal, Canada.

New York State Coal Merchants' Association will meet Thursday, Feb. 27, at the new Pennsylvania Hotel, New York City. Two sessions are to be held, followed by a dinner at which addresses are to be made by prominent speakers. Secretary, L. V. Shepard, Elmira, N. Y.

Industrial News

Pikeville, Ohio—The Kentenia Coal Sales Co. has filed a petition in voluntary bankruptcy in the United States Court at Cincinnati, showing liabilities of $14,733.48 more than its assets.

Wellston, Ohio—The Morrow Manufacturing Co. has established a branch-selling office at Knoxville, Tenn., and in future all business intended for the Southern territory should be addressed to the Tri-States Machinery Co., Knoxville, Tenn.

Charleston, W. Va.—The Paint Creek Coal Mining Co. has renamed some of its coal-mining towns on Paint Creek. The town of Old Detroit has been changed to Glen Buddy. Collinsdale is the new name for Hickory Camp, and Greencastle is now Ireland.

Bloomington, Ill.—The Chicago & Alton is storing 50,000 tons of coal at North Springfield and is also storing coal in Rogers ballast cars at Normal, Ill. The company is also storing 8000 tons of coal for the Chicago, Peoria & St. Louis at Ridgely, Ill.

Norfolk, Va.—The Virginian Ry. new car dumper at Sewalls Point is now in operation. U. S. Navy Collier "Orion" was loaded at the Virginian Pier at Sewalls Point on Feb. 13 in six hours and twenty minutes, taking 9622 gross tons of cargo and bunkers. This excellent dispatch is due to the efficiency of the new car dumper.

St. Louis, Mo.—The Mancha Storage Battery Locomotive Co. announces that Carson W. Smith, who formerly represented the company in Denver, Colo., has been elected secretary of the concern. This leaves the Mancha company without a Denver representative at present, but arrangements are being made and the name of the new representative will be announced shortly.

Urbana, Ill.—The Student Branch of the American Institute of Mining Engineers was reorganized by students of mining engineering of the University of Illinois under the leadership of Prof. H. H. Stoek, head of the department of mining engineering. This work was laid aside during the period of the war, but the mining engineering students state that they expect to formulate plans which will make the Urbana Student Branch of the American Institute of Mining Engineers one of the most active and profitable in the country.

San Francisco, Cal.—Coal received from all sources in San Francisco during the twelve months of 1918 amounted to 224,638 tons, according to the figures compiled by the marine department of the Chamber of Commerce. These receipts were divided as follows: From British Columbia, 82,581 tons; from Washington, 12,352 tons; from domestic rail, 129,705 tons. During the year there were no cargoes from Australia, Great Britain, the European Continent or Japan. There was brought by rail during the year 4690 tons of coke. The following are the coal receipts for the past eight years: 1917, 477,127 tons; 1916, 395,864 tons; 1915, 407,887 tons; 1914, 372,105 tons; 1913, 452,310 tons; 1912, 463,041 tons; 1911, 583,034 tons; 1910, 534,258 tons.

Seattle, Wash.—Vice President and General Manager N. D. Moore, of the Pacific Coast Coal Co., has added to the personnel of the firm by the appointment of S. H. Green as assistant to the vice president and the appointment of W. J. Santmyer as advisory engineer with full jurisdiction over its powdered coal department. Mr. Santmyer was formerly superintendent of the steam department for the Puget Sound Traction, Light and Power Co. He was electric engineer for the E. P. Allis Co., predecessor to the Allis-Chalmers Co., and was chief engineer for the Baltimore & Ohio Ry. power plant at the time of the electrification of the Baltimore belt line tunnel, the first important electrification of the kind in the country.

Charleston, W. Va.—Though unfavorably reported by the Committee on Mines and Mining of the West Virginia Legislature, the Blizzard bill requiring all companies to install scales and to pay all miners by actual weight was not rejected when reported to the House. When the question of rejection came up for consideration, Delegate Blizzard made a motion that the bill be placed on first reading instead of being rejected, so that the Legislature might consider the bill on its merits. On the other hand, Delegate J. S. Thurmond of Greenbrier, urging rejection of the measure, argued that there was no demand for such a law as was proposed from sections where there were no scales and that the proposed law would only impose unnecessary burdens on operators at a time when such operators were least able to bear them. However, the House by a vote of 58 to 16 placed the bill on the calendar instead of rejecting it.

Greensburg, Penn.—Approximately 15,000 tons of coal were mined and 1,000,000 tons of coke manufactured and shipped from Westmoreland County during 1918, according to statistics which have recently been completed. While the output of the larger concerns was slightly less than during 1917, this was due in a general way to the labor shortage. This deficit in tonnage of the larger companies was more than made up by the establishment in this county during the latter part of 1917 and early in 1918 of more than 200 small operations. Wages of coal miners during 1918 were the highest ever paid. Statistics show that miners generally averaged at least $6 per day during the year. This is an increase over the previous year of approximately $1.75 a day. The average yearly earnings of miners for 1918 were $1800, while the amount earned by many thrifty miners was more than $2500 to $3000 for the year, or $250 per month. While $150 was the average monthly wage, many miners drew as high as $400.

MARKET DEPARTMENT

Weekly Review

Lowered Output of Both Hard and Soft Coal, Due to Lack of Demand — High-Grade Soft Coal Maintaining Price Level—Anthracite Inquiry Slumps Because of Mild Weather—Increase Expected in Prices of Hard Coal

THE output of both anthracite and bituminous coal from week to week continues to reflect the stagnant condition of the coal market. Not a mine in the country is working at full-time capacity. Furthermore, hardly a day passes that does not see an addition to the already long list of operations forced to shut down because of the surprising lack of demand for coal.

The production of soft coal for the week ended Feb. 8 (the latest statistics available) amounted to only a little more than eight million net tons. This is a drop of more than two and one-half million net tons when compared to the output of the similar week of 1918, and a decrease of over six million net tons when set against the high peak reached during the week ended July 13, 1918.

Certain grades of bituminous coal are still reported as being sold at concessions from the Government maximum, though the high-grade coals are being sold at from 15c. to 45c. above the maximum prices, with perfect satisfaction to the consumer. Operators are adhering to their policy of shutting down rather than sell at a loss. Having virtually done a winter business during the summer, most operators are content to do a summer business this winter, biding their time until demand again becomes active. Little contracting is reported, most large consumers awaiting the outcome of the railroad fuel controversy.

Owing to the continuance of moderate temperatures in the anthracite-consuming sections, consumption of hard coal has failed to meet expectations. Many collieries have curtailed operation, a number of them taking advantage of the lull to make much-needed repairs and extensions to their plants.

The output of the hard coal mines during the week ended Feb. 8 is estimated at 1,144,000 net tons, which is the lowest production recorded in the past few years. It would not be much of a surprise in some quarters to see an increase in the price of certain sizes of anthracite in the future. Predictions are freely made that this increase will go into effect by Apr. 1, if not sooner.

WEEKLY COAL PRODUCTION

Bituminous—Estimates place production of bituminous coal during the week ended Feb. 8 at 8,040,000 net tons, which falls 291,000 net tons below the production of the week of Feb. 1 and 2,521,000 net tons below the corresponding week of 1918. The average production per working day during the current week is estimated at 1,340,000 net tons, as compared with 1,860,000 net tons for the coal year to date and 1,744,000 net tons for a similar period of last year. The production for the coal year to date, now estimated at 502,107,000 net tons, exceeds the production of last year for the same period by 31,129,000 net tons. A continuation of the low production recorded during the past few weeks for the balance of the coal year will cut this excess down approximately one-half, and production for the coal year ended Mar. 31, 1919, will not exceed 565,000,000 net tons.

Anthracite—A considerably greater decrease than in bituminous production occurred in the anthracite output for the week ended Feb. 8, this decrease amounting to 377,000 net tons, or approximately 20 per cent. below the output of the week of Feb. 1. The production during the week of Feb. 8 is estimated at 1,444,000 net tons, and is the lowest production, with the exception of Christmas week, 1918, recorded during the past few years. The average production per working day during the current week is estimated at 241,000 net tons, as compared with the daily average for the coal year to date of 310,000 net tons, and as against the daily average of the coal year to date of 1918, of 317,000 net tons. The total production for the coal year to date now amounts to 83,807,000 net tons, as compared with 85,528,000 net tons during a similar period of the 1917-18 coal year.

Car Loading—Carriers' reports for the week ended Feb. 8 show that car loading decreased in all districts during the week with the exception of Ohio, southwestern Virginia and the district including Illinois, Indiana and western Kentucky. In Ohio the increase in cars loaded amounted to 760, in southwestern Virginia to but 112, and in the Illinois, Indiana and western Kentucky District to 2467. The greatest decreases occurred in the central Pennsylvania and southern West Virginia fields. In the former district the decrease amounted to 4511 cars and in the latter district to 1125 cars.

New England Shipments—Shipments of bituminous coal to New England during the week ended Feb. 8 are estimated at 283,217 net tons, and are 5.3 per cent. below the shipments of the week preceding. This decrease is entirely attributed to shipments by rail, which amounted to 106,848 net tons, and fell 25.3 per cent. Tidewater shipments, amounting to 176,369 net tons, increased over the week preceding by 13 per cent., all harbors reporting improvement. Total shipments to New England for the coal year to date now amount to 22,617,592 net tons, of which total rail shipments amount to 8,595,567 net tons, and tidewater shipments to 14,022,025 net tons.

Tidewater Shipments—Tidewater shipments from the North Atlantic ports and Hampton Roads, during the week ended Feb. 8, amounted to 670,445 net tons, exceeding shipments of the week preceding by but one-half of one per cent. Shipments from Baltimore increased 8 per cent. and from Hampton Roads 8.8 per cent., while New York and Philadelphia shipments decreased 8.5 per cent. For the coal year to date shipments by tidewater now amount to 37,434,908 net tons, which total comprises shipments from New York and Philadelphia of 18,105,978 net tons, from Baltimore 3,292,220 net tons, and from Hampton Roads 16,125,710 net tons. Carloads of bituminous coal on hand at all harbors, on Saturday morning, Feb. 8, amounted to 12,765.

Beehive Coke—The production of beehive coke in the United States during the week ended Feb. 8 is estimated at 504,000 net tons, and is a decrease of 29,000 net tons, compared with the week of Feb. 1, and a decrease of 13,000 net tons, in comparison with the corresponding week of 1918. The average production per working day, during the current week, is estimated at 84,000 net tons, as against 89,000 net tons during the preceding week, and 86,000 net tons during the week of Feb. 8 of last year.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is running a little less than for the same period of 1918. Road sales for at-once delivery are slightly ahead. Merchants are placing liberal orders for handkerchiefs, delivery to be made in the fall. Retail business continues excellent. Collections are continuing good.

Bradstreet's—Trade advices are a shade more cheerful, the movement of peace-time industries outside of textile lines is a trifle faster, and collections are a bit better. These statements, of course, must be taken with knowledge of the fact that buying, especially of wearing apparel at wholesale, is conservative and not equal to that of a year ago; that rain or snow the country over has checked country trade and marketing of products, especially of corn and hogs at the West; that lower cotton prices discourage southern buying and promote talk of crop area reduction; that a great many textile-mill hands are striking or otherwise idle, pending the settlement of the shorter week issue, and that the number of unemployed is larger, owing mainly to the continued releases of men from the army.

The Iron Age—Further cutting of prices is now being admitted by producers as necessary to kindle the interest of buyers. The conclusion reached is that lack of important inquiry in the past nine weeks of open market conditions is in part due to maintaining a level of prices too high to encourage barter. How to get labor to recognize its part in the adjustment is the problem. A sale of 4000 tons of pig iron is noted for export and Cleveland reports an inquiry for 5000 tons for China. On 300 tons a cut of $1.80 from $31 per ton was made by an Eastern furnace, but 3000 tons for Italy was withdrawn on the price account. The demand of the automobile trade is the outstanding feature of the domestic market. Sheet mills are running at 75 per cent. of capacity and mostly for motor cars and trucks.

Dry Goods Economist—The impression seems to be gaining ground that large quantities of cotton are being held in the South and that this cotton will soon be forced on to the market through the banks calling in their loans. Evidence that this view is well founded is presented by the continued decline in price. March options were quoted on Thursday at 22.22 cents as against a fraction below 24 cents a week ago. Mills and dealers continue to show unwillingness to buy wool at the upset prices below which the Government will not dispose of its holdings. This attitude was clearly evinced at last week's auctions in Boston, when a large proportion of the offerings had to be withdrawn. Further reductions have been made by jobbers in prices of ginghams, prints and percales. Some of the drops are as great as 40 per cent.

American Wool and Cotton Reporter—In the Boston wool market there is an undercurrent of strength and considerable anti-

mism is expressed by a number in the trade. The labor difficulties have not been universal as the woolen mills have not been affected. These mills are scattered all over the country and are better situated in this respect. The technical position of the cotton market is bullish. The South is holding strong in spite of labor conditions and the decline. Cotton owners in the South are selling their low grade cotton first, if possible, and holding the higher grades for more advanced prices. Two factors at least tend to maintain strength in the cotton market. One is that jobbers are bound to get rid of all surplus high priced goods in filling their orders and another is that as soon as the peace treaty is signed, it is expected that Europe will buy a large amount of low grade stocks.

Dun's—More than any other single factor, and with increasing force, the price question dominates the economic situation. Response has come quickly in the isolated cases where recent readjustments have largely met buyers' anticipations, but price deflation has not yet gone far enough to induce general and vigorous operations, and the hoped-for trade revival still waits. Purchasing only for immediate and well-defined necessities, continuing the rule for many weeks in most leading branches, has brought a sharp industrial reversal, and strikes have been but a contributing cause of the steadily diminishing activities and lessening employment of labor. While manufacturing is not on a uniform basis, plants in the West being relatively busier than those in the East, and some lines doing better than others, hesitation remains a conspicuous feature in all directions and not a little machinery is standing idle solely through lack of orders.

Atlantic Seaboard

BOSTON

Market shows no change. Water-borne coal practically at a standstill. Steam-users with tidewater facilities alarmed over inaction on shipping situation. Other difficulties. Railroads take only small tonnages. Large number of shippers, both rail and water, without effective orders. Dullness at Hampton Roads and New York reflected here. Slight scattering demand all-rail, but confined to small users. Several textile plants shut down because of wage differences. Georges Creek offered for smithing. Anthracite price program rumored. Will the market stand it? Inequalities as to rates of freight need correction. Dearth of inquiry except for hand-to-mouth use. Mild weather and light retail demand.

Bituminous—The extreme dullness that has settled down over the market like a wet blanket continues without any special development. Factors in the trade have about given up making any serious effort to get business for the present, so entirely discouraging is the current situation. Orders are scarce and prices on distress coal are at a low ebb. Mines, steamers and rehandling plants, in all of which New England shippers are interested, are many of them without a wheel turning. There is no reasonable hope of improvement until well into the spring, if then. There are large stocks to be worked off in every direction, and who would buy water coal today unless he were under obligation to accept deliveries on contracts made dring the stringency? There is nothing for the trade to do but mark time and wait for better things.

Not in years has there been a time when so little steam coal has moved by water. No shipper is hardy enough to venture cargoes on the market for disposition on arrival at this end, and even those who have rehandling plants are moving so little to their inland trade that there is no storage available for any greater volume of coal than is now coming forward. Some of the smaller rehandlers are even taking small supplies all-rail rather than take the chance of lower prices by water. There is no confidence in present price levels on the smokeless grades from Hampton Roads and there are still enough cargoes afloat that were shipped on old contracts to consignees now unable to take them to depress the spot market for a long time to come. There are cases where barge transportation was chartered last spring and summer in the broadcast fashion that then prevailed, but now that tows are moving regularly and loading dispatch is almost instantaneous the barges are making trips must faster than the coal can be used or stored. The result is an accumulation of barges at points like Providence with some very heavy bills for somebody to pay. As previously reported, the best obtainable price on some of this distress coal is a figure less than the f. o. b. level at Hampton Roads, wiping out the $3 or more freight which the barge owners collect. There are likely to be still heavier losses if shippers continue to load transportation that consignees are not in position to receive.

The railroads are taking only small tonnages of supply coal. Aside from a limited movement in railroad-owned barges from Port Reading, N. J., most of the railroad fuel now coming forward is shipped all-rail with almost no new purchases. Operators are doing their best to encourage buying by the railroads, some very lower prices having been rumored. It is said that $1.70 per net ton has been quoted by producers in central Pennsylvania, but no one believes any comprehensive tonnage has been placed even at that low figure.

The number of operations closing down seems to increase each week. This is true in West Virginia, in central Pennsylvania, and in the Pittsburgh districts as well. Operators represented in this market report that they have enough contract business on their books but that the consignees are still unable to accept deliveries because of large stocks and poor business. The large mills of the American Writing Paper Co., at Holyoke, Mass., are running on about a 25 per cent. basis, so little demand is there for their output. Certainly there has seldom been a season when coal conditions were so absolutely dull at Hampton Roads and at New York, where there have been practically no sales of certain grades for weeks at a time. And there is not likely to be inquiry from this territory until buyers are given some assurance that shipping and other difficulties will be straightened out.

All-rail there is a little better demand for spot coal, but it is partly induced by low prices. In any case the improvement is very slight, and is confined to scattering sales to small consumers whose storage was too small last year to load up to the extent that was true of others.

One of the results of the removal of zone restrictions is the reappearance of Georges Creek in this market. The price, $3.50 f.o.b. mines per net ton, is so high, however, that it is being bought only in car lots for forge purposes.

Anthracite—It is now intimated that the program is to make no reduction this year on domestic sizes. In other words, instead of the usual 50c. drop Apr. 1, the plan is to continue the present price basis until May 1, when the price will begin advancing 10c. per month until the maximum is reached in September. The advertisements last week throughout this part of the country were understood to be part of a campaign to prepare the public for such an advance, the farewell address of the U. S. Fuel Administrator being liberally quoted in support of the operators' views. There is a distinct feeling among the trade that prices are too high and cannot be made to prevail without widespread criticism. There is a feeling also that too much reliance has been placed in cost estimates submitted by small independent operators who in normal years have not been able to put coal on the market in competition with interests in better position to produce coal at medium cost. In other words, there has seemed to be a disposition to lift the price so that any operator could mine coal at a profit whether his particular output was necessary to the market or not.

Inquiry for anthracite is very light. The mild weather has affected retail demand, and householders will buy only from hand-to-mouth, there is much faith that prices are bound to be lower. Straight cargoes of stove or chestnut are now easily to be had and practically every shipper is hard at work soliciting orders, although with very little success.

NEW YORK

Local situation dull and buying is restricted to actual needs. Conditions are unequaled. Coal in oversupply at time of heaviest consumption. Trade looks for change in prices either up or down. Anthracite may be pooled. Bituminous situation quiet. Plenty of coal and many loaded boats in the harbor. Concessions heard of. Operators urge shippers to sell stocks.

Anthracite—The situation here is without an outstanding feature. Buying is restricted to actual needs and as a result there is an over-abundance of coal of all sizes to be had. Conditions have never been equaled. During what is generally the best month of coal consumption there is an oversupply, very little movement and many mines either closed down or their operations curtailed. The suspension of operations is not confined entirely to the Independents, but many of the collieries of the larger operators are also affected.

Reports from the coal regions indicate an increasing amount of dissatisfaction due to the lack of work, many workers grumbling because of the reduced earnings and the H. C. of L. Replying to this complaint the operators only have to point to the lack of demand and the present supply of coal.

There is no such thing as the 75c. differential between Company and Individual coals. Shippers of the latter product are willing to dispose of their holdings at the Company schedule, but even at that they find their work cut out for them. It was reported that sales of domestic sizes have been made at 20c. per ton below the Company schedule.

The trade was interested in the publication, as an advertisement in the daily newspapers last week, of Dr. Garfield's statement made at the time he issued his order removing the restrictions over the coal industry. It felt that it meant an increase in prices, and while no announcement has come from the operators, it is the belief among the trade that the present schedule will remain in effect until Apr. 1, and that the usual monthly increase of 10c. per ton per month for five months will follow.

There are some coalmen, however, who frown upon any intimation of an advance, claiming that the present is no opportune time to increase the price of coal to the public. They say that many things can happen between now and Apr. 1 and that the situation will be governed entirely by the law of supply and demand.

The sentiment for the formation of a pooling arrangement for anthracite similar to that for the pooling of bituminous is said to be growing. Many wholesalers believe that some such arrangement must be made to avoid the heavy demurrage charges which have and will continue to accrue.

Consumers are not expected to buy heavily under present conditions. Most all have enough coal to last them from six to eight weeks, and as they expect the usual spring discount are not placing any new orders. Local dealers have more coal in their yards than at any other period during the past year, and instead of accepting deliveries are cancelling orders.

There is no improvement in the steam-coal situation. The cut in production has naturally reduced the output and the docks are not as well stocked as they were a couple of weeks back. Considerable variation of quotations for the three sizes has been heard, much depending upon the quality of the coal. The better grades of buckwheat have been held at from $2.50 to $2.70 at the mine, and the cheaper coals from 20c. to 30c. less. Quotations on rice coal are generally about 50c. lower than those on buckwheat.

The dullness of the market is reflected in the dumpings of anthracite reported for the week ended Feb. 14, when 3429 cars were dumped as against 5014 cars the week previous, a decrease of 1785 cars.

The retail situation is quiet. Many dealers having a family trade almost exclusively have hardly anything to do and their drivers are consequently idle. Many of the dealers in Brooklyn are circularizing their customers, offering to deliver to them the balance of their undelivered order placed with the Fuel Administration last spring.

Bituminous—The situation is quiet. Inquiries have fallen off and shippers with coal coming forward are wondering what is to become of it. There is practically no demand and buyers are generally able to receive quotations considerably below what they paid for coal a couple of months back.

Conditions are such that local concerns are being urged by operators to dispose of coal either here or on its way. Market conditions have not been satisfactory for some weeks, and it is as difficult now to dispose of coal as at any previous time. Buying stopped suddenly and the market was caught unprepared. There was more than enough coal here to take care of current needs, to say nothing of the quantity on its way from the mines. Wholesalers found themselves overburdened with supplies and no place to put the coal.

In addition economic conditions had intervened and factories using thousands of tons began to reduce their working hours, consequently deliveries were reduced with the result that where these factories a couple of months ago had from two to three months' coal supply on hand they now have from four to five months.

There is no market, and with the coal piling up at the piers dealers have had to force the coal on the market at reduced prices in order to save demurrage charges. The harbor is filled with loaded boats, and these cargoes have been let go at heavy concessions, according to report.

Wholesale dealers do not look for a brisk water trade for the next couple of months, or at least until there is a settlement of the labor troubles between the boat-owners and their employees. Should the latter secure a wage increase and a reduction of working hours it will naturally result in

an advance in boat rates, which will cause many dealers who can do so to order their coal sent by rail.

The local ports have been under embargo at one time or another, for the past month. Dumpings for the week ended Feb. 14 show that 5624 cars of bituminous coal were dumped as compared with 6779 cars the previous week, a decrease of 1155 cars.

There are many inquiries regarding contracts, but so far nothing definite has been done regarding price although it is said some quotations indicate prices around $3.50 for the high grade coals.

A continued curtailing of production for the next several weeks is expected to rid the market of much of the surplus coal now on hand, and it is hoped the situation will be healthy with better prices.

Quotations on high-grade coals ranged during the week from $2.50 to $2.75 at the mines, with the cheaper grades from 50c. to 75c. lower.

PHILADELPHIA

Anthracite market dull and unsatisfactory. Production is curtailed and efforts being made to prevent market from becoming overstocked. Mine workers want more work, but realize there is no demand. No immediate change expected in prices. Bituminous situation quiet. Operators curtail production and prevent heavy cuts in prices. Contract making being considered.

Anthracite—Conditions here are serious. Demand has tumbled, and there is more than enough coal on hand to meet all requirements for several weeks to come. To meet this depression the operators have placed most of the mines on a three-day-a-week basis, and it is said many of the smaller operations are not doing as well as that.

Reports from the coal regions are disquieting. Many of the workers believe there is no necessity for the present suspension of operations, and with their present earnings they find it difficult to maintain their families. However, everyone knows that the market is overstocked and that the only solution of the difficulty is a cut in mining.

Wholesale dealers have received many cancellations of orders as a result of present conditions. There has been a disappearance of the 75c. differential between Company and so-called Independent coals, but even this does not help to reduce the stocks. Retail dealers report a heavy depression with no prospects of better business ahead for several weeks to come.

Opinion regarding future prices is divided. There are many who look for no change until May 1, when they believe there will be an advance of 10c. per ton per month for five months, while there are others who expect the usual spring discount of 50c. per ton on Apr. 1. This latter report is also current in the mining fields.

The supply of steam sizes does not increase owing to the cut in production, but there is an abundant supply and quotations are easy.

Bituminous—The local situation is far from satisfactory. The market is not overstocked as is the case in other localities, but there is more than sufficient coal to meet all current requirements. While there are many reports of coal being sold at prices that will not pay the cost of production, they have not been verified and, if true, are few and far between. Operators realize that to do so would be a losing venture and one that would not pay.

There has not been a heavy cut in prices here, the trade preferring to keep the coal at the mines rather than have it sent to this market to await buyers. This procedure is likely to be followed until the market strengthens and there is a better demand. This is not expected to happen, however, for a couple of months, as most of the factories dependent upon this market have filled bins, large heaps of coal in their yards.

The matter of contract making for the next coal year is being given some attention. There have been many inquiries but little if any signing up to this time. Operators are not inclined to be hasty in closing deals for their output with the market in its present unsteady condition, while consumers believe they will be able to do better by waiting than to close up at the suggested prices. While no definite announcement has been made it is understood that the prevailing quotation on contracts is around $3.50 for the high-grade coals.

Reports from inland are to the effect that there is an abundance of coals in the various factory yards, most of it having been bought at the full Government price. As in other sections, some of this coal is being transferred to factories not so well supplied but which are under the same ownership. Until this high-priced coal is consumed salesmen fail to see much opportunity for further business.

C. H. Markham, Regional Director for the Allegheny Region, in his report for 1918 to W. G. McAdoo, Director General of Railroads, states that during December of last year anthracite coal loading increased 1456 cars, or 2.9 per cent.; bituminous loading increased 35,944 cars, or 17.7 per cent.; and all coal loading increased 37,400 cars, or 14.8 per cent., as compared with December of 1917.

Mr. Markham's jurisdiction includes the terminals on the New Jersey side of the North River, as well as the lower ports supplying the New York market. His headquarters is in Philadelphia.

Continuing his report Mr. Markham says that during December of last year tidewater coal dumped was 2,158,490 tons, an increase of 471,117 tons, or 21.8 per cent., as compared with the previous December.

BALTIMORE

Soft coal market still overstocked. Government control still remains, and brings Tidewater Exchange problems. Hard coal offered by mines on company mine-price basis.

Bituminous—Every pier approach, every line siding and all approaches generally by rail to the city show a big run of soft coal for this section. That the market is overstocked is undoubted. Prices in many cases have been still further cut. Some handlers say that they are getting some business but could handle much more; others say frankly that things are bad and that it is not now so much a question of price as it is to get someone to absorb the fuel that is here or urgently offering from producing points where the upkeep of organization at mines is essential.

The Shipping Board has recently found itself hampered by a great amount of coal that it could not handily absorb, and the ordinary shippers' business at the piers was further blocked by this Government department insisting that some incoming ships which might have taken outside fuel receive only the Government owned coals aboard.

The trade just now is discussing rather warmly the question of the Government dropping the last vestiges of control over the fuel industry. In this connection interest will be centered for a time in any possible action to follow the meeting in Washington recently of the Government Tidewater Exchange officials and prominent shippers of coal. Some warm opinions are understood to have been expressed in Washington during the meeting. The Lakes are said to be especially hot over some alleged inequalities, and at this point, while some shippers express satisfaction with demurrage apportionment, there are handlers of coal who have some kicks to register. It may be stated that with the recent congestion here a number of shippers are uneasy over the prospective size of demurrage bills with the coming month.

Anthracite—The hard coal trade here is still purchasing cautiously. Prices have not been cut here as in Philadelphia and Boston. Dealers here have always claimed that the margin of profit was too small under Government dictation. Meanwhile mines, irrespective of whether they are company owned or independent, are offering coal at the company schedule. There is more than enough coal running already than is called for by consumers. Only by forcing deliveries to the utmost through telephone call urgings, etc., is the trade prevented from accumulating a dangerous surplus in these times of high-priced coal.

Lake Markets

PITTSBURGH

Production below 30 per cent. capacity. Fairly steady market on regular lots, with demurrage coal at great sacrifices.

The Pittsburgh district coal market is almost absolutely dead. Demand is of almost negligible proportions, as to new buying, while nearly all contract shipments are greatly reduced, partly because consumers require less coal than formerly and partly because they are using up stocks. Production in the Pittsburgh district, which dropped to about 30 per cent. of capacity two or three weeks ago, is now at a somewhat lower rate still. Many mines are closed entirely while practically none are operating at capacity.

Leading operators are making a strong effort to maintain prices, but there are many producers who would cut prices if it were possible thereby to obtain an efficient operation; so little tonnage is to be sold by cutting prices, however, that there is no general disposition to do so. The really low prices that are made in the market are on coal that by one mischance or another is loaded and must be moved to avoid demurrage. Such coal has been dumped on the market at $1.50 or possibly less. Apart from such coal the market is fairly well maintained. On high grade gas and by-product coal prices are relatively stiff at about the old Government level of $2.35 for mine-run. An effort is made to maintain circular prices on contracts, circular prices being based on $2.50 for mine-run, but hardly any business has been done on this basis. A few contracts have been put through for high grade ¾-in. gas coal for the twelvemonth beginning Apr. 1 at $2.60. Apart from low prices done on emergency sales of coal loaded on track the market is quotable at $2.20@2.35 for mine-run and $2.35@2.60 for ¾-in. gas, per net ton at mine, Pittsburgh district.

There is much unrest among miners, and it is recognized that any effort to reduce wages would probably precipitate a great deal of trouble. At the moment miners are relatively contented to be idle, but their funds are not large and there may be discontent on the score of idleness. The union is rich, but it is very doubtful whether any funds would be used to support miners in idleness, unless resulting from a regular strike.

BUFFALO

Still a coal surplus. Anthracite about as much in excess as bituminous. No spring contracts in sight.

Bituminous—The coal situation does not change materially. Shippers say that the surplus is as evident a ever, and they see no return yet of the looked-for increase in consumption that is to reduce the supply and bring about an active market. Till that takes place there is not much use of looking for relief. All that can be done is to sell as much coal as possible, and when the consumer will buy no more the mines must close.

It is coming pretty close to spring, but there is little said of the usual contract period. Nobody knows what to do about it. When there was talk of advertising for waterworks coal, the largest city contract, it was said that shippers would not dare to make figures lower than the going price. Maybe that is why no bids have been asked for.

Anthracite—The trade is not going to pick up till the weather is colder, for the season is so far advanced that it is a strictly weather market from now on. From all sides come reports of more coal than is needed. Anthracite is on demurrage in Montreal, and the upper lakes are expected to be obliged to carry over a large amount of last summer's lake shipments.

Buffalo is said not to have much of a supply on hand, but that is only because nobody feels uneasy over the situation. All that the consumer is anxious about now is whether the operators are going to be allowed to advance the price. Anthracite at $10 a ton and bituminous about half that price seems out of proportion, the consumers think.

CLEVELAND

Bituminous is moving into this district at about 30 per cent. of normal. This is by design and represents the efforts of operators to keep production apace with demand. The last Government maximum prices continue to rule on all standard grades. Anthracite supplies now are in excess of the demand. Some Pocahontas is beginning to come in.

Bituminous—Southern and eastern Ohio mines are now being operated on approximately a 40 per cent. schedule, while receipts in Cleveland and the northern Ohio industrial district are about 30 per cent. of normal. This briefly tells the story of bituminous here, and gives evidence of what success operators have had in restraining efforts to force a situation that apparently cannot be forced. Operators are adhering to their platform that they will close rather than operate a a loss. While coal to the west has been advanced, $2.35 continues the mine-run quotation here. As operations at the mines grow smaller, car-service coal becomes scarcer, and concessions from the $2.35 price fewer.

The situation at Ohio mines is reported fast approaching a serious state. John Moore, president of the Ohio Mine Workers, is authority for the statement that 15,000 coal miners in Ohio have not worked one day since New Year, while 30,000 have worked less than half of the time.

The retail market, like the steam-coal one, seems past all human help. One cold day is succeeded by three warm ones. Pocahontas is beginning to dribble in, but no insistent demand for it has come to the surface. Retail dealers are resigned to a summer business the remainder of this winter and all of next summer.

Anthracite—The present supply is more than ample to meet all needs, and competition for business is sharp. Stove and furnace grades are now equally plentiful.

Lake Trade—Lake coal shippers and the upper lake dock interests must make a strenuous fight to convince the Railroad Administration of the necessity of relaxing upon demurrage regulations in order to make possible abandonment of the Great Lakes coal pool, it now becomes apparent. A conference with the railroad officials at New York proved unsatisfactory, and a further meeting is to be held soon at Washington. The pool is much to the liking of the railroads, from an operating standpoint, and all of the decisions of the coal interests to resume individual shipping will be of no avail unless the administration eases up on its demurrage rules.

Early cargoes will not be in demand in the spring, as the docks at the head of the lakes still carry unusually large piles. In January only 20,430 carloads were moved off the Duluth-Superior docks, as against 30,123 in January, 1918, and 30,707 in January, 1917. Some shippers are figuring on early cargoes, though price will not be generally talked until after Apr. 1. One of the loading machines at Ashtabula, Ohio, is being put in shape and will be ready next week.

DETROIT

Little stimulus appears to have been imparted to the Detroit market for bituminous by removal of the Federal zone and price restrictions.

Bituminous—No marked improvement in the market for bituminous coal in Detroit is reported to have followed the termination of Fuel Administration zone regulations and price control. The reason, according to jobbers, is that the local situation is abnormal, due to the magnitude of stocks of coal in yards of retail dealers and in storage piles of the steam plants. Reduction of these excessive stocks proceeds slowly in the case of both classes of buyers.

Besides having their yards crowded with bituminous coal, a great deal of which is of low quality and in a form their customers don't want, the retailers are finding their business is curtailed by the competition of a better grade of stock now reaching the market, and the attempt of household consumers to end the use of bituminous as speedily as possible, since Government regulations no longer compel their acceptance of a fuel that they find undesirable in heating plants designed for use of anthracite.

Anthracite—Slight improvement in supply of anthracite is reported by some of the dealers. Because of the continuance of moderate temperatures consumption has fallen short of expectations and quite a large proportion of the retailers appear to have stocks of anthracite. Several are advertising ability to supply all domestic requirements in any size of anthracite. The plentiful coke supply also is a factor in easing strain on anthracite. There are indications of higher prices on some sizes.

COLUMBUS

The coal trade in Ohio continues quiet in every respect. Warm weather has curtailed domestic demand. Steam trade is small, as surplus stocks are still heavy. Prices are fairly well maintained.

Quietude characterizes the coal trade in Ohio territory. Owing to the continued warm weather there is little demand for domestic grades. Retail stocks are sufficient to take care of current needs, and dealers have not been forced to replenish their stocks to any extent. There is still a limited demand for Pocahontas and other fancy grades, but since the raising of the zone regulations those grades are moving without hindrance. The tone of the market is not good and there is no immediate prospect for betterment according to producers and shippers.

In the steam trade more inquiries have been received, indicating a more optimistic feeling generally. Some of these inquiries have developed into orders, but the movement is rather restricted. A canvass of the situation shows that large consumers still have heavy surplus stocks and it is their policy to consume the greater part of these surpluses before ordering more. Manufacturers are slow in getting on a peace basis and thus their fuel requirements are not large. Railroads are not buying to any extent although their orders are larger than was the case several weeks ago. Railroads are still trying to buy below the Government levels and some tonnage is moving at reduced prices. But generally speaking the larger operators are holding up on price and the market is not demoralized.

Domestic stocks are large. Householders who put in their fuel stocks last summer and fall will in many instances carry over some into next winter. This is one of the bad features as it indicates a rather slow domestic demand during the summer months. Retail prices are fairly well maintained as the larger producers and distributors are not cutting. It is realized that lower prices would not stimulate trade and there is not much desire to do business at a loss.

CINCINNATI

Colder weather is drawing upon retailers' and consumers' stocks and making room for further deliveries. Prospects for Western business improving in consequence.

The heaviest snowfall of the winter in this section occurred last week, accompanied by colder weather than has prevailed for some time. This combination has materially stimulated consumption. Retailers report a better demand for coal, especially in one- and two-ton lots, and it is believed that a continuance of cold weather will go far toward reducing the accumulated stocks in the hands of dealers and consumers.

Aside from the local situation the interest of the trade is turned toward the West, where efforts are to be renewed for the sale of coal for the coming season. An unusual indication of the extent to which the general distribution of coal along highly competitive lines is to be the rule was a large advertisement appearing in local papers last week on behalf of anthracite coal. The advertisement recounted briefly the effect of Fuel Administration action upon the distribution of anthracite, and stated that hard coal is now available for general distribution everywhere, at reasonable prices. As this fuel has never had more than an insignificant sale in Cincinnati, not to mention the rest of the Middle West, aggressive sales efforts on its behalf may afford some evidence of the way operators are going after business, especially where they are accustomed to handling it.

LOUISVILLE

Colder weather and snow improve feeling somewhat. Fair demand for domestic continues at high levels. Steam coals draggy and hard to dispose of.

More nearly winter weather during the past few days has encouraged the trade somewhat, but retail movement continues dull, with the trade buying from hand to mouth and carrying little domestic stock on hand as deliveries can be secured quickly and the average retailer is playing safe on the market.

A few retailers have been running a little low and have been rushing in orders for a few cars here and there, but the demand is not heavy. Domestic is generally keeping the operators busy on a two- to three-day running basis, but even on this small time they are having trouble in disposing of resulting fine screenings, nut and slack, etc. Prices for domestic are running 15c. to 40c. a ton higher than when regulations were lifted, while nut and slack are off 15c. to 20c. a ton average, and much more in some instances. Egg and 4-in. mine-run are in fair demand.

Many operators believe that there will be a good demand for steam within a short time as some of the overstocked industries will shortly begin running low, and rail buying should start again, while the export situation looks better. However, with an increased demand for all grades of steam, operators in many instances are figuring on a hard time in disposing of domestic coal, as not much early stocking is expected.

Retailers are generally well fixed financially this year, due to short-time credits and a preponderance of cash business. Some retailers have little money out on 1918 coal deliveries, and are in position to take discounts. However, collections are nothing like as good as they were, due to a general fight for business, resulting in bars being lifted. The operators are no longer shipping any volume of coal on a sight draft basis, as there are too many who are willing to ship on almost any kind of basis, with the result that collections have dropped off materially.

BIRMINGHAM

Steam market sluggish, with little spot business offered. Some accumulation of low and unprepared grades. Domestic demand good, there being a shortage in supply. Larger mines operating full time, while operations at the smaller ones is rather unsteady.

There is a decided weakness in the local steam coal market and the volume of spot trade is small, buying being confined to the better grades of fuel and to current requirements of consumers. There is some accumulation of Big Seam and similar grades, though not sufficient tonnage to have any weight on market conditions, as operators as a whole are holding their output to the approximate requirements of the trade. Contract users are in most cases taking the minimum tonnage stipulated in their agreements with the mines, while there are some cancellations and hold-ups or open business. However, there is no voicing of pessimism in coal circles and the future of the trade is viewed with calmness and confidence. Price schedules closely approximate the Government figures as of Jan. 31 and are firm, quotations being as follows f.o.b. mines:

	Mine-Run	Prepared Sizes	Slack and Screenings
Big Seam	$2.45	$2.75	$2.40
Black Creek and Cahaba	3.45	3.75	3.05
Pratt, Corona, Jagger	2.85	3.05	2.45

The domestic trade is strong and receipts considerably below requirements, all the better grades showing an advance since Feb. 1. Quotations are as follows:

	Lump and Nut
Black Creek	$4.50
Corona	3.65@3.75
Jagger	3.50
Montevallo	5.00
Cahaba	4.50

The mines of furnace producing companies are operating steadily, as are also most of the commercial mines, there being some loss of time at small operations depending almost entirely on the demands of the spot trade.

Coke

CONNELLSVILLE

Market soft. Further contract readjustment. Continually decreasing production.

The coke market is very soft. Operators have been making an effort in the past few weeks to curtail production in keeping with decreasing requirements of blast furnaces, but have been uniformly a lap or two behind, so that limited tonnages of coke have had to be dumped on the market, having been loaded without a destination. Such coke has been available down to $4.50 and $4.25, and some of the $4.50 coke is probably of altogether standard quality. On the other hand operators would hardly sell coke still to be made at less than $5 for furnace grade. Standard brands of foundry coke are held at $6 and some sales are being made at this figure. Generally speaking the spot and prompt market may be quoted at $4.50@5 for furnace and $6 for foundry, per net ton at ovens.

As already reported, the majority of contracts that called for negotiation as to price in the event of Government control coming off have been adjusted so that February shipments are billed at $5.50. Some adjustments, it appears, were made at close to $5. As to contracts that called for "last Government price," the pressure of furnacemen has been such that the operators quite generally have revised such contracts, to a level of about $5, this adjustment to be not specifically for the month of February but rather to stand until conditions change further. From the present outlook it is quite possible that further downward readjustments may eventually be made.

The outlook for Connellsville coke is that it will sell at no more than the cost of coking, after the coal has been priced at the market value, profit to operators being entirely on the coal. Byproduct ovens will naturally run full as they can convert the coal at less cost than the beehive ovens. Standard grades of byproduct coal are worth about $2.35 at present, which on a two-thirds yield makes about $3.50 for the value of coal used in making a ton of Connellsville coke. The coking operation, without overhead, will run considerably under $1, so that eventually the coke market is likely to be $4.50 or less, and considerably less in case the value of coal declines.

Buffalo—The trade sympathizes with coal, though the prices of the higher grades have not suffered much. The chief difficulty is that the furnaces are not buying at all liberally, as they have a big supply ahead of them. The byproduct ovens here are pretty busy, though they are not able to dispose of all their off grades and breeze, and are obliged to stock some of it. The furnaces insist on what was Government price for what they sell, which is $9.60 for 72-hour foundry, f.o.b here.

Middle Western

GENERAL REVIEW

Market conditions still inactive. High grade coals maintain price. Railroad fuel question still unsettled. No improvement in market expected until peace is signed and industry resumes full operation.

The coal markets of the Middle West continue inactive, with little coal produced and less sold. The market has had an opportunity to adjust itself to conditions brought about by the abolishing of the zones, and it is surprising to note how well prices are being maintained. All of the high-class coals from Illinois and Indiana are selling at the previous Government prices or higher. The poorer grade coals continue to be sold at a discount, which is no more than just.

The question of railroad fuel continues to drag, greatly to the dissatisfaction of the operators. It is the general opinion in coal-mining circles that the railroads and the politicians are getting together to beat down the price of coal. In view of the fact that the coal industry made an enviable record during the war, and by considerable sacrifice contributed in no small way to the successful culmination of the war, the operators almost as a unit feel that they are being ill used. They have no desire to become the pawns in a political game of chess, in spite of the best efforts of certain altruistic gentlemen in Washington.

All demand for steam coal is at a full stop, not so much because storage piles are being used, but because manufacturing of all kinds is practically at a standstill in the Middle West. Factories are closing down daily, with prospects of more inactivity in the near future. Coal men are looking for no radical change in this general condition until peace is signed and the authorities at Washington indicate to the nation what to expect.

Two large steam-coal contracts have been awarded in this territory in the last week. Both contracts were for military camps, and the combined tonnage was possibly 75,000 to 100,000 tons. It is said that some of the bids were below the last Government figures, and that the parties awarded the business cut the price. This, perhaps, is another indication that the Government is interested in price rather than quality.

The domestic situation is a little better than heretofore, except in Chicago. Throughout Illinois, Indiana, Wisconsin, Iowa and Michigan reports have come in that the retailers are once more buying. They are very careful, however, to purchase only the best to be had. The increase in price, affecting all high-grade coal from West Virginia, Indiana and Illinois, is making little difference to the trade. The dealers who are accustomed to furnishing their trade with the best are paying the price, while the others are continuing to purchase any off-grade bargain that is offered at a cut price. It is a gratifying fact, however, that the demand for good coals at a fair price, is far in excess of the demand for poor coal at a cut price.

CHICAGO

Little domestic demand owing to mild weather. Owners of storage piles anxious to get rid of them. Steam-coal demand inactive.

Chicago has been enjoying its usual bracing spring weather. One domestic dealer on the North Side reports an adventurous dandelion growing in his coal yard. This will serve to convey to the reader that there is little domestic coal moving in Chicago.

An unfortunate situation has arisen as an aftermath to the Fuel Administration's reign. There are many yards in the city that have on hand huge piles of Illinois and Indiana lump and mine-run. This coal has been in storage since last spring, or since last summer, and as a consequence is deteriorating very rapidly. As a result, the owners of this coal have been doing everything possible toward moving this storage; in fact, it was reported that some quotations on storage coal were made on a basis of $2.50 on mine-run delivered. This represents a loss of at least $3 per ton to the dealer, and it shows how anxious those who have stock piles are to get rid of them.

The steam-coal market continues inactive in the extreme, as the general lax manufacturing situation is as true of Chicago as of the surrounding territory.

MILWAUKEE

Coal trade continues lifeless. Little demand from city or country. Prices are maintained. Pocahontas mine-run reappears.

The coal trade at Milwaukee continues lifeless and discouraging to those having large stocks on hand. The month of February is usually a fuel-eater, but it is half gone and the cold wave flag has not been displayed as yet. The demand from local consumers is very light, and there are practically no calls from the country. More Illinois coal than usual was sent to the interior of Wisconsin during the past summer, and much of these stocks still remain. This lets lake dock men out of the game at present. The same conditions exist at Manitowoc and Sheboygan. Prices are maintained, however. One yard is advertising anthracite received by rail at the same price as lake coal. Bituminous egg and nut is held by the same yard at $7, with a charge of 50c. per ton for carrying in. This is a little under what other yards are charging for Eastern soft coal. Pocahontas mine-run has appeared in the market. It is held at $8.15. No other grades of the coal are offered, however. Leading dealers hold that there will be no cut in prices because of the present situation, and even intimate that an advance in anthracite might yet be necessary. Everything is being done to stiffen the morale of the trade, upon which the future of the remainder of the season's stock piles seemingly rests.

ST. LOUIS

Market continues quiet and sluggish. Coal selling below cost under forced conditions. Cars plentiful, movement good and much dissatisfaction at the mines on account of no work.

In the Standard field some mines have had screenings on hand for over a month, and several mines have not worked for over two weeks on account of the surplus of steam sizes. This condition is almost general throughout the Standard district and to some extent is also affecting the Mt. Olive district. Lump is moving fairly well because the tonnage of coal produced decreases gradually, but even at that there is no ready market for all the lump coal that is mined daily.

There is much dissatisfaction in the Standard field among the miners, who contend that they cannot exist under the present conditions. They do not understand why the operator should cut his price to the public when the cutting of the price does not sell any more coal; and if anything is to be given away, they figure that the miners should get more for the coal on account of their shorter working time and that coal should sell on the market for the Government maximum.

In the Mt. Olive field conditions are somewhat better, but also very unsatisfactory. The prices are holding up pretty well, but the coal is not moving and there is no market for it.

The tonnage in the St. Louis market is small. A fairly good tonnage continues to move north and the railroads are still taking some coal from this field.

In the Williamson and Franklin County district the mines are idle, as usual, on account of steam sizes; and some of them have not enough orders to keep them going on domestic sizes. The Franklin County field is solidly tied up on the $2.75 price for domestic sizes and operators feel that if they cannot get that they are going to stay idle.

In the Williamson County field just a few operators are asking the $2.75 price. The result is that the Franklin County operators are not working as steadily as the Williamson County independent operators, who are quoting from $2.35 to $2.55 for lump, egg and nut, with screenings as low as $1.70 to $1.80 and mine-run at $2. The independents seem to get pretty nearly full working time, but even at that every night shows their tracks occupied with cars of unbilled coal of all sizes.

The Du Quoin field is somewhat similar to the Williamson County field. Some of the operators are asking the $2.75 price, and others $2.55 and less, with no demand for the product.

The general condition throughout the St. Louis territory is not satisfactory on account of the Standard condition. If the Standard market was in better shape it would have a more wholesome effect on the whole situation.

Throughout the West it is expected that the tonnage of egg and grate will perhaps be decreased by one-half of what it formerly was the coming season, while the demand for stove and chestnut will pretty nearly measure up to past requirements.

There is everything to indicate that the price on coal in the West will have to be increased. One coal-carrying road spends $1.02 for every dollar that it takes in. There must be an increase in rates and coal will come first.

The anthracite operators have been advertising their predicament in the Western daily papers in such a way as to indicate that they must get more money on and after Apr. 1.

The present prevailing prices on retail coal in St. Louis are: Anthracite—grate and egg, $12.34; stove and chestnut, $12.60. Coke—Gashouse, $11.25; byproduct, $12.35. Bituminous—Carterville lump, egg and nut $6; Mt. Olive lump, $5.25; Standard lump, $5.

The market here, with the exceptions as noted above, is as follows:

		Mt. Olive and Staunton	Standard
Franklin County:			
Prepared sizes (lump, egg, Nos. 1 and 2 nut)	$2.75	....	....
Williamson County:			
Prepared sizes (lump, egg, nut)	$2.55	$2.55	(As noted
Mine-run	2.20	2.20	above)
Screenings	2.05	2.05	....

Williamson-Franklin rate to St. Louis is $1.10; other rates, 95c.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Feb. 17, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	145	146
Burns Brothers, Pfd	(BB)	110	115½
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	36⅜	37
Colorado Fuel & Iron, Pfd	(CF)	99	....
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	25	30
Elk Horn Coal, Pfd	(EH)	39	47
Island Creek Coal, Com	(ICR)	39	47
Island Creek Coal, Pfd	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	60	....
New Central Coal of West Va	(NCC)	5	....
Pittsburgh Coal, Com	(PC)	46	46½
Pittsburgh Coal, Pfd	(PC)	85	86
Pond Creek Coal	(PD)	12½	13½
Virginia Iron, Coal & Coke	(VK)	55	60

*Ex. Div.

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd., 6s, 1922	90	....
Clearfield Bituminous Coal, 1st 4s, Ser. A., 1940	75	....
Colorado Fuel & Iron, Gen. 5s, 1943	90	91
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	74	75
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87⅛	92
Grand River Coal & Coke, 1st 6s, 1919	....	....
Jefferson & Clearfield Coal & Iron, 2d Mtg. 5s, 1926	96	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	98	....
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1933	79	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s. Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	86½	89
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	87⅛	90
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	81½	83
Tenn. Coal, Iron & R.R., gen. 5s, 1951	91	95½
Utah Fuel, 1st Sinking Fund, 5s, 1931	86½	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	65	70
Virginia Iron, Coal & Coke 1st 5s, 1949	87	89¼